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SEPTEMBER 1970

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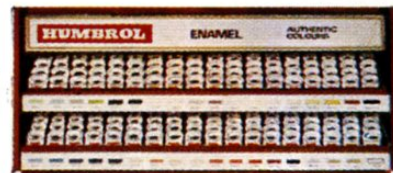
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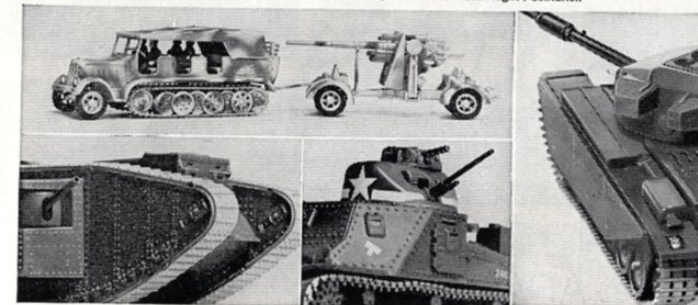


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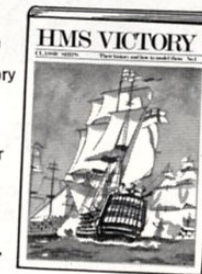
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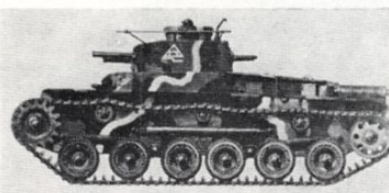
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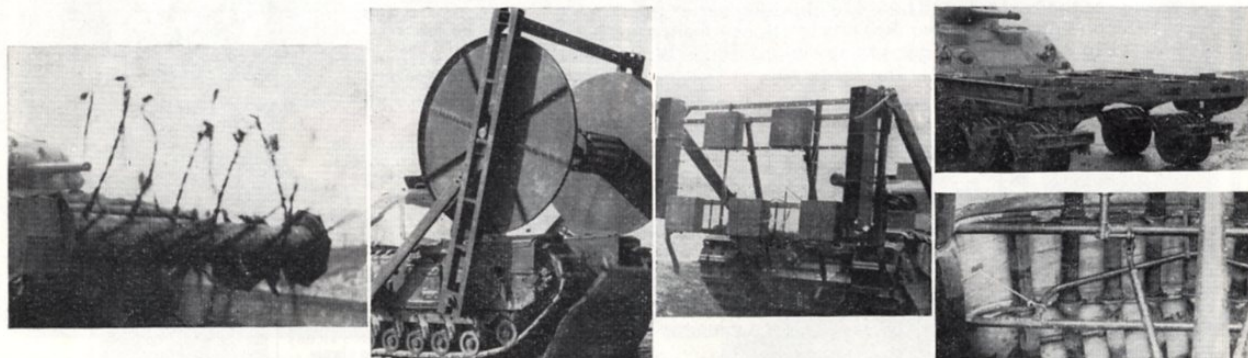


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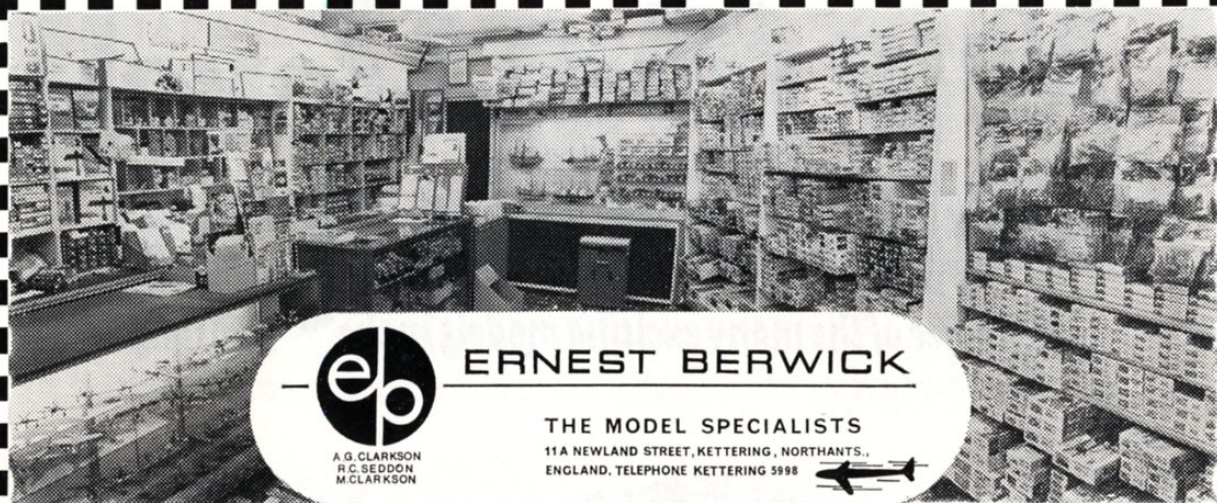
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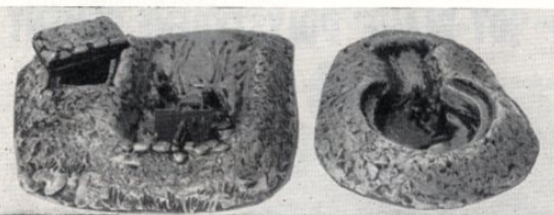
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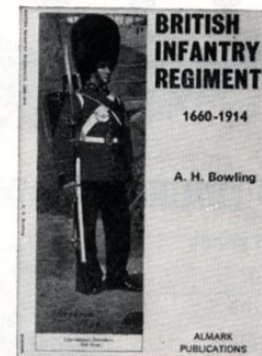
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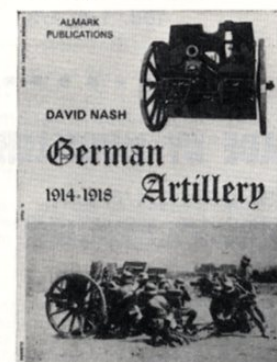
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AIRFIX magazine

## AIRFIX magazine FOR PLASTIC MODELLERS

September 1970

Volume 12 No 1

Editor Chris Ellis

#### Cover Picture

Designed as a replacement for one of the most famous trainers of all—the Avro 504—the Avro 621 Tutor began to replace the 504N in 1932. Powered by a 215 hp Armstrong Siddeley Lynx seven-cylinder radial engine, the Tutor would cruise at 102 mph and had a maximum speed of 122 mph. When they first entered service, the Tutors were finished aluminium overall, with the red, white and blue tail stripes and usual roundels, but in 1935 they were changed to the yellow scheme with the aluminium cowling and panels left in their buffed state as illustrated. The machine depicted was attached to Number 610 (B) Squadron based at Hooton near Birkenhead, the '610' being painted on the forward fuselage.

The Tutor was eventually replaced by another famous trainer, the Tiger Moth, but a Tutor owned by the Shuttleworth Trust can still be seen performing on special flying display days. Unfortunately no kit of the Avro Tutor is available, but scale drawings, plus details for scratch-building a model to 1:48 scale in plastic sheet, appear in *How to Go Advanced Plastic Modelling*, published this month by Patrick Stephens Ltd.

(Photo by B. Baker from a painting by R. Williams)

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# NEWS FROM AIRFIX

The world's greatest value in construction kits

- De Havilland Chipmunk
- HMS 'Iron Duke'
- SRN4 Hovercraft
- Mayflower
- BAC Jaguar
- Toyota 2000 GT
- HMS 'Leander'

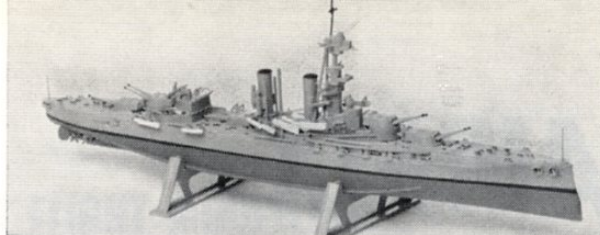
NEW addition to the Airfix range of scale model aircraft kits is the De Havilland Chipmunk, a famous training aircraft of which more than 1,300 have been built. It was adopted by the Royal Air Force as a basic trainer in 1948 and is still used today for primary training by the RAF, Army and University Air Squadrons. It was first produced by De Havilland in Canada where it is flown with the new 'bubble' cockpit canopy by the Royal Canadian Air Force. The 1:72 scale kit has 23 parts which make an authentic model just over 4 inches in length with a wing span of 5½ inches.

Airfix have provided alternative canopies, transfers and colour schemes so that the aircraft can either be made up as the basic RAF trainer or as a CAF aircraft. Price of the kit is 2s 11d.

THE most famous battleship of the 1914-18 War, HMS *Iron Duke*, which was the Flagship of the Grand Fleet at the time of the Battle of Jutland in 1916, is the latest Airfix 1:600 scale warship kit. The 12½ inch long Airfix model includes 183 finely-moulded parts and modellers will be pleased to note that the five gun turrets each carry twin 13.5 inch guns which can be elevated to various positions. Built into the side of the ship are twelve 6 inch guns, six on either side, which can be traversed.

Highlight of this model is the intricate deck detail which apart from heavy and numerous light armaments includes whalers,

Below: The new Airfix Chipmunk.

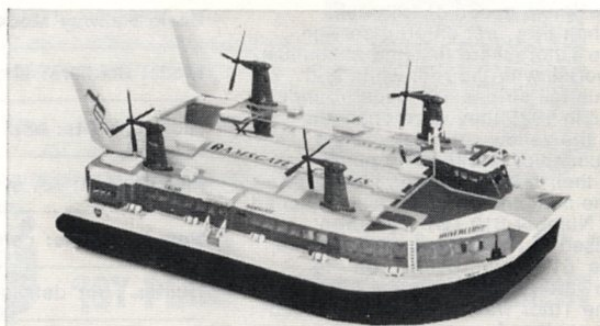


Above: Airfix HMS Iron Duke.

launches, cutters, a host of navigational and communications equipment, a complex tripod mast and two funnels.

*Iron Duke* was built at Portsmouth dockyard and was powered by 30,000 hp turbines giving a maximum speed of 21 knots. This particular Airfix kit has been designed to the HMS *Iron Duke* specification as at the Battle of Jutland when she was the flagship of the Commander-in-Chief, Sir John Jellicoe, and had a complement of 1,000 officers and crew.

ONE of the most ambitious kits ever produced by Airfix, the SRN4 hovercraft in 1:144 scale, includes over 269 separate parts and when completed the model measures 10½ inches long by 6½ inches wide. Airfix designers have carefully reproduced all the intricate detail of the 'Mountbatten' Class SRN4 Hovercraft



Top: The new Airfix SRN4 Hovercraft to 1:144 scale. Above: The BAC Jaguar, supplied in British markings.

which is built by the British Hovercraft Corporation. The kit costs 23s 6d and includes miniature cars and a transparent hull section.

A 90 PART kit of the *Mayflower* is a further new release, which appropriately Airfix have decided to introduce during this year for the 350th anniversary of the voyage of the Pilgrim Fathers to America. Designed with the advice and assistance of the National Maritime Museum, the made-up model is 15 inches long and includes all the intricate detail one would expect to find in an Airfix 'Classic Ship' kit. It costs 21s 6d.

Continued on page 38

AIRFIX magazine

## NEW BOOKS REVIEWED FOR MODELLERS

### New model book

CLASSIC SHIPS AND HOW TO BUILD THEM: No 1, HMS 'VICTORY', by Noel C. L. Hackney. Published by Patrick Stephens Ltd, 9 Ely Place, London EC1, in association with Airfix Products Ltd. Price 21s.

HMS *Victory* is a deservedly popular kit in the Airfix 'Classic Ships' series of kits, and most modellers would rate it one of the best. At *Airfix Magazine* we continually hear from aspiring ship modellers who, having purchased one of these intricately detailed kits, then desires to complete the model to the highest possible standards of finish. The first obstacle here is the kit itself, for in the case of these big sailing ships, Airfix kit designers cannot make a model too complicated for the average purchaser. So they simplify the rig a little so that even a youngster given a supply of thread can turn out properly braced yards and spars to give a convincing appearance to the model at a reasonable distance. The trick of providing pre-formed ratlines is another well-known aid for the younger or less skilled modeller. The keen enthusiast who studies the subject of rigging after making up one of these kits soon finds that the simplification of the kit rigging doesn't satisfy him any more; in short, he yearns for a good amount of extra detail to be included. Now ship models in these larger sizes are fairly complicated and to do a really good job of scale rigging you need to be a 'master rigger' in miniature and know the subject inside out. Few have either the time or the research facilities to acquire the necessary knowledge, and it is this new series of Patrick Stephens Ltd/Airfix books which sets out to provide you with an 'instant' guidebook or manual for the task.

Noel Hackney, the author, will need no introduction to *Airfix Magazine* readers for last year he was responsible for the popular 'Sailplan' series which was an introduction to the art of rigging plastic ship kits. In this book he takes on HMS *Victory* almost literally from truck to keel and shows how a competent modeller can turn the kit into a showpiece model of exhibition standards—with pictures of his own model to prove it and to illustrate the work involved. The book has a colour cover showing HMS *Victory* at Trafalgar, and the first four chapters deal with the history of the real ship in a detailed and interesting way. The remaining seven chapters cover the modelling work—tools and materials, colour schemes, modifications to the hull, short cuts in rigging, assembly and rigging, signal flags, and sail rig are the main chapter headings. The 'short cuts' chapter, incidentally, should encourage anyone who thinks that the book might be above his head, for it shows a lot of useful 'wrinkles' which take the complications out of much of the work without detracting from the fine scale appearance of the completed model.

The lengthy text is logically presented in order of working—though it helps to have the kit or model in front of you when reading the rigging chapters just to keep a clear mental picture of the work involved at any given stage. Apart from numerous pictures showing details of both the model and the actual ship, the book is packed with excellent scale drawings of every part of the ship—from a GA of the rigging plan to drawings of individual blocks and deadeyes. Even ship lovers who are not actually modellers will find this wealth of material of great interest. There are 96 pages in total, 16 pages of pictures, and 59 drawings, while the page size is about the same as *Airfix Magazine*. Incidentally, ship modellers who see the length and complexity of the book will appreciate that this individual treatment of a particular kit of this type could not possibly be accom-

September, 1970



The new Airfix 'Classic Ship' model of Mayflower, described opposite.

modated in the pages of this magazine—hence the book. At its modest price, HMS *Victory* is a good buy for ship modellers; the second title will deal similarly with the *Mayflower* and will be published next November.

### Coastal boats

INSHORE CRAFT OF BRITAIN IN THE DAYS OF SAIL AND OAR, by Edgar J. March. Published by David & Charles Ltd, South Devon House, Newton Abbot, Devon. Two volumes, price 63s each book.

THESE two beautifully produced books make a magnificent record of the little boats used until recent times—indeed a few survive in use—round the coasts of Britain by fishermen, longshoremen, pilots, and local traders, with the emphasis mainly on fishing boats for these, of course, existed in greater numbers than other types. For anyone with the slightest interest in small boats, the books make fascinating reading but they provide a real treat for the shipping enthusiast and boat modeller. The author is himself a well-known modeller and this is reflected in the wealth of constructional and detail sketches, not to mention full-scale plans which are included here. In addition there are dozens of rare and fascinating pictures making a really complete record of the subject. Volume 1 works down the east side of Britain from the Shetlands to the Thames, while Volume 2 deals with the south and west coasts, each chapter covering a specific area of coastline. Even non-enthusiasts seeking accurate details for small boats in model harbour scenes can profitably consult these two volumes.

### For car fans

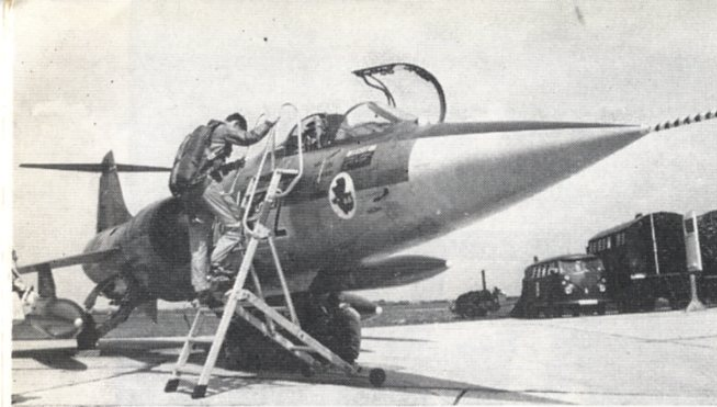
THE FORD GT40, by David Hodges.  
THE GP MERCEDES-BENZ W125, by Denis Jenkinson.

Both published by Lionel Leventhal, 677 Finchley Road, London NW2. Price 28s each.

FIRST in a new series, these attractively produced books will appeal to both car enthusiasts and car modellers since they not only include detailed histories but are also replete with a wealth of pictures, scale drawings, detail illustrations, and cut-away views. Photographic reproduction is excellent and the text in each case is very readable even for the non-technically minded. Of the two, that dealing with the Ford has a slight edge, at least when studied from a modeller's point of view, since it has slightly more in the way of detail views and colouring details for the various team cars. The dust-jackets of these books have nicely drawn colour illustrations of their respective subjects.

Continued on page 42





THE resurgence of the German Air Force after World War 2 has been rapid but not unhindered by many political pressures from both inside and outside that country. It has grown from nothing to be one of the most powerful air arms in Europe, bettering the RAF in fighter and attack aircraft strength and equalling most of the other neighbouring air forces in operational equipment.

With a force of nearly 1,000 F-104 and Fiat G.91 aircraft, the Luftwaffe is at present divided into two Gruppen, the north centred at Munster and the south at Karlsruhe. Overall command is centred at Köln/Wahn. A look at the map will show that Germany, now divided into East and West, provides a long, rather thin area with the great industrial complex of the Ruhr in the centre, flanked by a bulge in the south with Munich the main town, and in the north with Hamburg being the principal city. Air defence of such a long and comparatively narrow strip provides a number of problems for the Luftwaffe air staff.

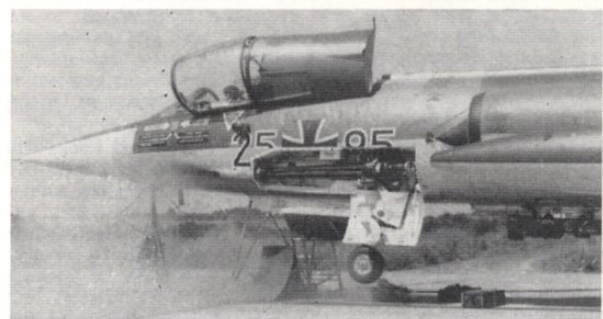
German air strength is fully committed to NATO. Luftwaffe-gruppe Sud, which I visited recently, comes under 4th ATAF, together with USAF and CAF units stationed in southern Germany. Each Luftwaffe Gruppe consists of six divisions; one for attack, two for air defence and three for logistics.

Most of the F-104s in the Luftwaffe are employed on fighter-bomber duties and the Karlsruhe-based Gruppe has three wings, Jabos 32, 33 and 34. There is one pure fighter squadron, JG74, at Neuburg and the reconnaissance wing AG51 at Bremgarten equipped with RF-104Gs. The two Fiat G.91 wings in the Gruppe, LVG 42 and 44, based at Pferdsfeld and Leipheim respectively, are divided between fighter-bomber and reconnaissance duties. Backing these are the air defence Hawk and Nike missile regiments at Freising and Giessen and Nos 31 and 32 communications regiments which are responsible for the air and ground control organisation.

The third division looks after logistics but only at ground level. All training comes under their command and also some of the communications network.

Re-equipment with RF-4 Phantoms, some 88 of which are on order at the present time, will take place shortly and some of these will go to AG51 at Bremgarten. The RF-104s will revert to the fighter-bomber role.

Each Luftwaffe wing consists of roughly 50 aircraft. Ten of these are normally kept in reserve and the remainder are split



The blast of the multi-barrelled Vulcan cannon on this F-104 lifts the nosewheel off the ground and ripples the fuselage skin below the cockpit. This is the firing test mentioned in the text.

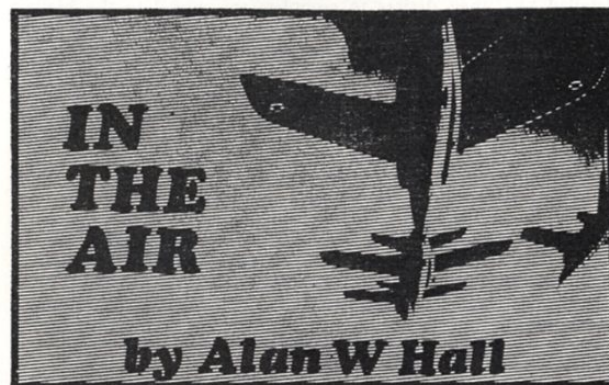
Left: One of AG51's RF-104Gs based at Bremgarten. These aircraft will shortly be replaced by RF-4E Phantoms.

between two Staffeln on each of the respective bases. I visited Jabo 33 at Bruchel in the Eiffel—a hill-top airfield set in beautiful countryside not far from the winding Moselle valley.

It proved to be typical of the NATO layout used on most operational continental airfields, having one 5,000 metre runway and dispersals spread out all round. So concerned are the German authorities about not being caught out with their aircraft neatly lined up for an enemy to catch on the ground that they have also dispersed the living accommodation for the base which is more than 12 km away. They prefer the insurance of keeping things this way rather than the loss of an estimated 1,000 man hours per day by commuting between the two areas.

Büchel was originally a French base built in 1956. The USAF had their eyes on it but eventually the Germans moved in Waffenschule 30 on November 13 of that year with F-84Fs. When operational training was complete the unit became Jabo 33 and continued with F-84Fs until these were superseded by the F-104 on August 8, 1962.

I got a good idea of the way in which the airfield's facilities were dispersed when I was shown round the heavily guarded



25 km of boundary fence. Suddenly one would come round a small group of trees to be faced with a brace of rapidly advancing F-104s making for the runway threshold. Elsewhere I was invited to see gun firing tests on one of the aircraft into a cleverly disguised 500 yard range. The power of the multi-barrelled Vulcan cannon was graphically illustrated by a short 20 round burst which nearly defeated the speed of my camera and knocked me over with the noise. Later I inspected the target pierced by the 20 mm shells all within a few inches of each other.

On another part of the airfield I was shown the open-air engine test area. F-104s on maintenance are stripped of their nose radar and rear fuselages, towed some three miles from the hangars and ground run with a vengeance. Rapid acceleration was followed by idling and then more bursts at full power. Luckily the airfield is fairly well removed from built-up areas or the noise nuisance would cause many complaints. Sound suppression consisted of an upward facing metal shield which was more for the protection of the surrounding vegetation than to cut down the noise.

In another clearing a nondescript building housed the F-104 simulator on which Luftwaffe pilots are obliged to spend much of their time. This equipment was on loan from the Canadians and had a visual flight record panel in front of the cockpit which covered an area immediately around the airfield.

Flying activity was intensive and the F-104s were continuously landing and taking off on training sorties. Detachments for weapons firing and bombing take place in Sardinia. Previously this has been done in Turkey but now the Luftwaffe are going to take over ranges in Crete. Apart from the F-104s I saw six T-33s and four Piaggio P.149s at Bruchel and was told that these were used for communications duties and for the carriage of small spare parts should an aircraft be forced to land away from its home base.

In all I was very impressed with the efficient way in which the



Top: Engine runs at full power during routine maintenance ensure that the Jabo 33 Starfighters are fully serviceable before being returned to front line duties. The noise is terrific and only the small steel blast shield prevents the flame from the aircraft's reheat system reaching the surrounding trees. Above: At the conclusion of a sortie in a two-seat Starfighter the crew leave the aircraft before returning it to the ground crew for servicing.

Luftwaffe went about its business. Security was obviously there though, as on most RAF bases, not apparent. It was brought home to me when I was about to take a photograph in one particular area and a loudspeaker blared out from somewhere in the rear with the well-known 'achtung'. I was being watched it seemed and from then on asked if I could take the subjects I wanted!

I was told that all aircraft flying on military duties in Germany are strictly controlled from the ground. The fact that an aircraft at supersonic speed could cross the buffer zone between east and west in a few minutes from Bruchel was constantly in the minds of German air and ground controllers. Supersonic speeds are necessary and are the cause of many complaints. These are dealt with by the Ministry of the Interior and there are many problems that have to be overcome. The Germans are well versed in the difficulties of living with supersonic noise.

Conscious of the nearness of Russian and Communist countries just a few miles away, standing air defence patrols are part of the standard pattern of operations. Aircraft are constantly kept in the air as part of the defence set-up, together with the USAF and Canadian Air Force units.

### F-104 casualties

Like most of us, I was aware of the great amount of publicity that the Luftwaffe had received through its apparently constant loss of F-104s. I therefore asked the reason for this and had a somewhat surprising and very logical answer.

The F-104 is the first aircraft chosen by the German government for use with the Luftwaffe. Previously the aircraft used were supplied by the United States and the Germans had no control over what they were given. The political pressures on what type to buy have resulted in a lot of controversy in Germany and naturally the press make the most of the decision to buy F-104s whenever a crash occurs.

Add to this the fact that almost all German fighter pilots had no previous experience of high performance aircraft and the most a pilot could reckon to have was 400 hours before he was thrust upon this supersonic beast. All training was done in the ideal climatic conditions of the States and to return to Europe with its variable sun, rain, ice, snow and fog was too much to ask. Add to this the fact that when the F-104s arrived, few internal servicing areas were available. Hangars were almost non-existent and much of the work had to be done in the open. Aircraft, particularly high performance ones, do not like being left out in the cold and deteriorate very rapidly.

I was shown the figures of comparative air forces equipped

with the F-104 and nowadays the Luftwaffe loss rate is one of the lowest there is. The figures for their F-84F losses are much greater but received no publicity whatsoever. The Germans are well pleased with the F-104. Equally so they like the Fiat G.91 in spite of varied reports from other sources. This is an efficient, easy to service and very robust light fighter-bomber well suited for the Luftwaffe's needs and will be hard to replace when the time comes.

I asked about re-equipment and the future of the Luftwaffe and was told that they do not intend to go in for VTOL aircraft at the present time. A full evaluation has been made of this type of aircraft and indeed the VAK-191 was an interesting prototype, but is not to be purchased.

The Germans mean to keep up with the times as far as their air force is concerned. Following the retirement of General Trautloft, the veteran commander of the present-day Luftwaffe, a general reorganisation will be taking place starting next October. A complete re-appraisal of air defence and organisation will be carried out with the idea of getting rid of unnecessary paper work and administration bottlenecks. It may mean that we will see an entirely new Luftwaffe emerge but certainly one with a most modern outlook aimed at making the most of all available facilities.



Top: Continuous flying goes on all the time at Bruchel. Here two F-104s of Jabo 33 get airborne whilst another taxis up to the take-off point. Centre: One of the six T-33s at Bruchel used by Jabo 33 as a communications aircraft. Above: Piaggio P.149s are also used for light communications duties. Note the Jabo insignia on the tail unit.

### New for modellers

PUBLISHED in September is a companion volume to *How to Go Plastic Modelling*, this new book being called *How to Go Advanced Plastic Modelling*. While Chris Ellis, Editor of *Airfix Magazine*, wrote the first book entirely, the new companion volume is more of a 'team' effort, edited by Chris Ellis, but with contributions by a number of specialists in various fields; these include Kenneth M. Jones on scratch-building model tanks, R. C. Gibson on OO/HO figures, Roy Dilley on 54 mm figures, Michael Andress on model buildings, Norman Simmons on model railway kits, Fred Henderson on scratch-building aircraft, and Noel Hackney on sailing ships. This isn't the complete list, for other sections cover Historex kits, Rareplane kits, Metalskin, as well as the more normal conversion and detailing of aircraft, ship, and AFV kits. There are 100 pictures and 68 drawings in the 192 page volume, and a great many practical conversion and modelling examples. Publishers are Patrick Stephens Ltd, 9 Ely Place, London EC1, and the book costs 40s, from booksellers, hobby shops, or direct from the publishers.

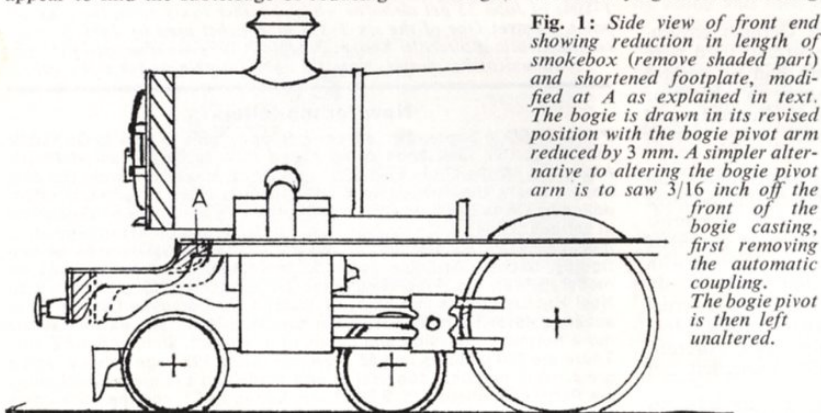




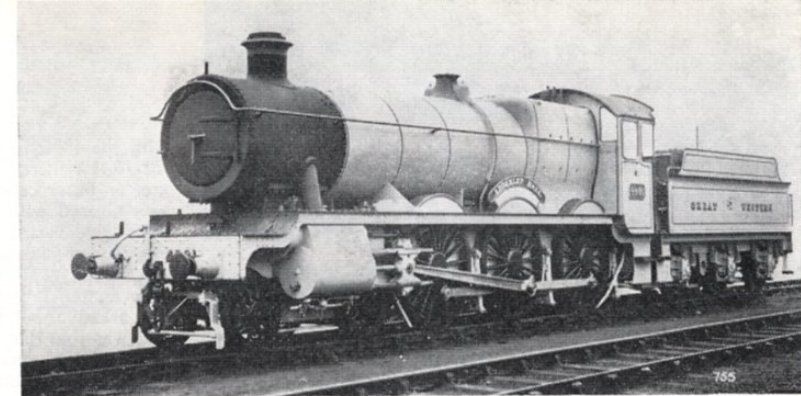
BY **NORMAN SIMMONS**

REVIEWS of proprietary model railway rolling stock items in the model railway press often include a table of figures comparing the dimensions of the prototype with the equivalent scale dimensions of the model. Not unnaturally the standard of the model is judged by how clearly its dimensions match those of the prototype. Invariably there are differences between the scale dimensions and the model and it is not altogether apparent why. It has, for instance, always been a mystery to me why Hornby Dublo almost always reduced the diameter of their locomotive coupled wheels. The often quoted excuse for this variation is because of the oversize flanges and the limited clearance inside the splashers. But there are no splashers on an A4 Pacific and if you look underneath a Hornby locomotive such as the GWR 'Castle', the flanges come nowhere near the splashers because of the underscale track gauge of 16.5 mm. A further 2 mm on the coupled wheel diameter would make no difference to the clearance problem but it would make a vast difference to the look of the wheels and the overall appearance of the model as the number of conversions to be seen on club layouts testify.

Strange to relate, Tri-ang do not appear to find the subterfuge of reducing



**Fig. 1:** Side view of front end showing reduction in length of smokebox (remove shaded part) and shortened footplate, modified at A as explained in text. The bogie is drawn in its revised position with the bogie pivot arm reduced by 3 mm. A simpler alternative to altering the bogie pivot arm is to saw 3/16 inch off the front of the bogie casting, first removing the automatic coupling. The bogie pivot is then left unaltered.



No 4901 Adderley Hall shown as new in an official GWR picture. This was the first new 'Hall' built—the prototype 4900 was a converted 'Saint'. Small tender, as originally fitted to early 'Halls', can come from the old Airfix City of Truro kit for anyone lucky enough to have a spare.

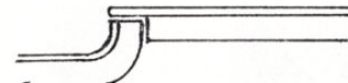
## IMPROVING THE TRI-ANG 'HALL'

the wheel diameter necessary and in a number of cases, the GWR 'Hall' is one, they provide modellers with exact scale diameter coupled wheels. But Tri-ang have a modification peculiarly their own. If you place an item of Tri-ang rolling stock buffer to buffer against almost any other OO gauge make, you will see what I mean. The centre line of the Tri-ang buffers is about 2 mm higher. Now it may sound like carping to talk about the odd millimetre or two until one realises the complications this leads to. On locomotives the front buffer beam and forward footplate invariably have to be raised, which gives them the appearance of being held in suspension above the bogie and the characteristic curvature of the drop footplate is very often spoilt. On the M7 where there is, of course, a straight footplate, oversize driving wheels have to be fitted to raise the buffer beam to the Tri-ang level. The tender underframes have to be made unnaturally deep and the body sides have to be reduced in height accordingly. This effect is also apparent on the cab side sheets. To check this, compare, say, the Tri-ang GWR 4,000 gallon tender with the Hornby Dublo equivalent. Somebody must go to a great deal of trouble altering all these prototype dimensions. I wonder why?

It goes without saying that the Tri-ang

GWR 'Hall' has its own share of these irritating discrepancies and for the purist modeller there is really no worthwhile way of overcoming them. It is far better to build from scratch or from a Wills Finecast kit. It must be admitted, however, for the average modeller viewing the model in isolation, the Tri-ang 'Hall' does look like a 'Hall' and it is undeniably reasonably priced. To count all its virtues it is also robustly constructed, mechanically sound and nicely painted and finished. The chimney is superb. In using a common chassis frame—the B12 uses the same component—the wheelbase is, of course, incorrect and the characteristic wider spacing of the rear pair of coupled wheels is lacking. This has in turn necessitated shortening the firebox, but somehow or other I find I can live with this. The one part that does jar above all, however, is the front end and ever since the model first appeared I have been conscious of this fact. The curved drop-down for the front is too far forward and the footplate itself is far too long. Presumably, in an attempt to make this fault less obvious, Tri-ang have lengthened the smokebox. Personally I don't consider they have succeeded at all and the extended front end only helps to emphasise the shortened rear end—dear oh dear! it never will be a perfect world! It is assumed that all this jiggery pokery is to enable the front bogie to swing round 15 inch radius curves and to give clearance to the front interlock coupling. Since more than a few modellers use other than Tri-ang interlock couplings, to say nothing of 15 inch radius curves, and since a full coupling is often deemed to be unnecessary on the front end of a model locomotive anyway, it seems feasible to consider ways of redesigning the front end on more prototypical lines.

First, of course, remove the body from the chassis and the bogie from the chassis. Now remove the smokebox front. This part was found to be only lightly cemented in place and it was easily tapped out from behind without damaging either the front piece or the smokebox itself. The smokebox was then



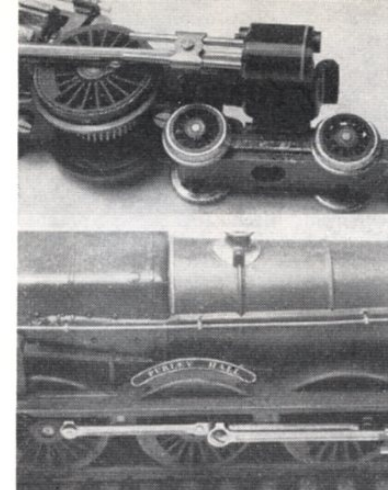
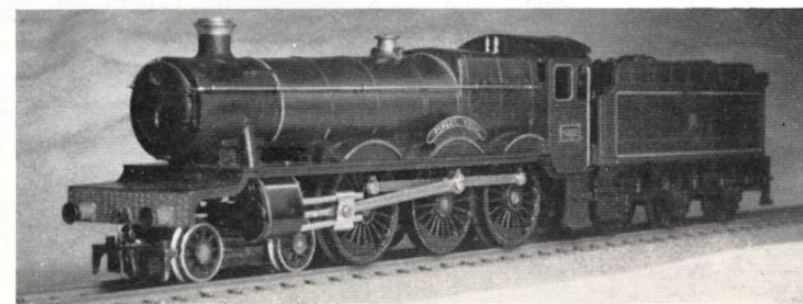
**Fig 2:** Showing how the curved step piece is re-positioned under the lip which is filed in the forward edge of the upper footplate, thus reducing height slightly as well as length of footplate.

reduced in length by 3 mm by cutting a 3 mm section from the front edge—see Fig 1. The groove in the base of the front edge was lengthened by 3 mm to take the projection at the base of the smokebox door, but since I intended fitting wire handrails no attempt was made to lengthen the grooves on the sides where the moulded handrail projections on the smokebox front normally fit.

Whilst the smokebox front was removed the opportunity was taken to cut away the BR smokebox number plate. The necessity for this operation will depend, of course, on the period of your layout, whether it is GWR or BR. The smokebox number plate obscures part of the topmost door hinge so when removing the plate it is necessary to leave enough material to simulate the door hinge. The moulded plastic handrail was also removed and the top lamp iron was trimmed with a craft knife to remove the solid effect as far as possible without weakening the structure too much. Wire smokebox door handles can be fitted at this stage but the Tri-ang Hornby ones on the 'Hall' are very neatly done and I decided to keep them. The smokebox front was then cemented back in place.

On checking the model against a 4 mm scale drawing it appeared that the main fault with the footplate on the Tri-ang model is that the curved downward step is too far forward of the cylinders. The footplate was sawn through at this point using a Junior Eclipse hacksaw blade, the cut being made immediately behind the curved step down (see A on Fig 1), and the footplate under the smokebox was cut back by 1 mm. Next, the underside of the forward edge of the footplate was filed back by 2 mm as shown in the enlarged view (Fig 2) so that the curved step piece could be cemented in place under the lip which is left at the top. This modification has the desired effect of lowering the buffer beam slightly as well as reducing the length of the footplate. When joining these two pieces together the parts were liberally coated with liquid cement as much as possible to ensure that they were thoroughly cemented together.

**Below:** Completed model, with fluting filed off the coupling rods to give more prototypical appearance.



**Above:** Close view of modified bogie with scale wheels fitted, though the wheels supplied can be retained if desired. Other view shows new wire handrail and brass nameplate in position. **Right:** Close view of modified front end and the new pivot for the tender coupling.

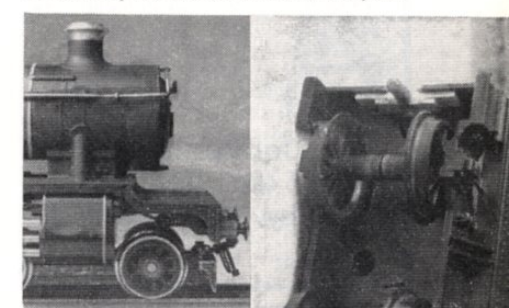
This is a potential weak point and as much strength and support should be built in as the restricted space will allow. The forward bracket on the chassis slots into the footplate at this point so for this reason alone it is necessary to give as much strength as possible. The slot for the bracket needs building up by a strip of 20 thou plastic card since the refitted front footplate is slightly lower at this point. The bracket itself also needs to be cut back by 3 mm. I took the opportunity to make the cut across the bracket diagonal when viewed from the side, so that the slope nearly matched the curvature of the dropped footplate. Mercifully, the bracket is long enough to remove 3 mm from the end but it leaves very little to play with. The part that remains is only about 3 mm long but I have found this is long enough.

To match the slight lowering of the front end you might find it necessary to lower the rear end. This is not so easy since it involves filling in the countersunk hole in the back of the body which takes the fixing screw and drilling another hole slightly higher. Also the part of the body which rests on the top of the chassis at the rear end needs to be reduced in height slightly. I say slightly as this all depends upon how much lower you have made the front end. I cannot be precise and it can only be judged by eye.

The Tri-ang bogie is just 1 mm too long in wheelbase for the standard 'Hall' Class which had a 7 ft bogie, but it is near enough right for one of the

'Modified Halls' which started at 6959 Peatling Hall and were built from 1944 onwards. Actually the Tri-ang 'Hall' lends itself well to conversion to a 'Modified Hall' since the vertical framing at the front end which is a distinguishing feature of this class can easily be simulated by pieces of plastic card which would add strength to the weak point at the front end. This largely follows prototype practice since the original 'Hall' was modified for this very same reason. Since I try wherever possible to model the pre-war GWR scene, I had no place for a 'Modified Hall' so kept to one of the originals and in fact chose 4959 Purley Hall as my prototype.

To revert to the bogie. The wheelbase is, as I said, 1 mm too long. The bogie itself is also too far forward. It is hardly possible to modify the wheelbase but I found it perfectly possible to drill another bogie pivot hole (the one in the pivot bar which takes the screw to fit the bogie to the chassis, not the other one which joins



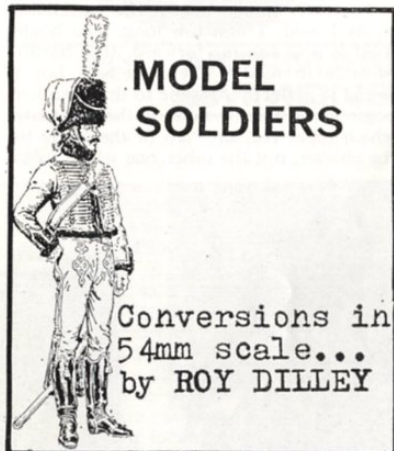
My own personal view is that these slight modifications make such a vast improvement to the appearance of the model that they are well worth doing.

Having hacked the model about this far, the next obvious step is to remove the moulded nameplates. They are such a disappointing feature of the Tri-ang model but I suppose it is difficult to imagine what else could have been done within the limitations of a mass-produced plastic model built to a budget price. Luckily the plastic moulding is not all solid at this point and once you have scraped away enough plastic to enable the craft knife blade to be inserted, it

*Continued on page 15*



OVER the past six months in this series of articles I have dealt with techniques for carrying out plastic figure conversions of varying complexity, from the very simple to the relatively complicated. The main types of plastic from which figures are commonly manufactured have been examined, and, I hope, the point has been thoroughly established that such items as heads, arms, and equipment, even though they may be made from completely different materials, can be combined with success in the creation of new pieces. Mastery of the techniques I have described, together with the exercise of a certain amount of imagination, must surely increase the



enjoyment and satisfaction that the enthusiast can obtain from this hobby.

Perhaps the most valuable quality a keen converter can cultivate is the ability to look at a commercially manufactured figure in terms of its 'Break-down' potential, that is to say the usefulness of its component parts in making up other stances, and orders of dress, etc. Interest in model soldiers and their accessories, vehicles, and so on, has never been greater than it is today, and, clearly, as more commercial figures become available on the market, so scope for the converter increases. More and more enthusiasts are making and converting figures to their own requirements, and in the process are displaying even greater skill and ingenuity. Application of technique and imagination having resulted in the production of a unique conversion, it becomes essential, in order to realise the full effect, that as competent a painting job as possible be carried out, so before I describe this month's conversions, here are a few of my thoughts on painting.

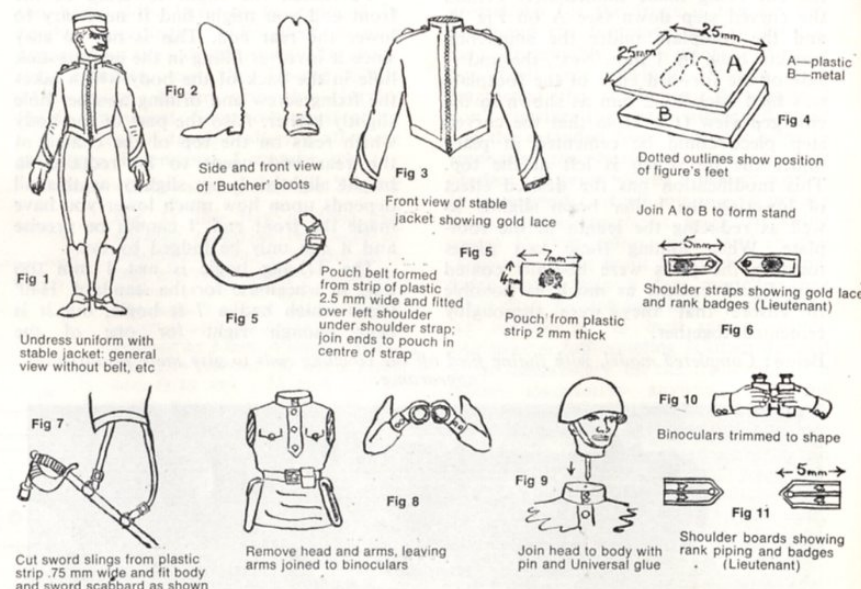
Although I have seen many display models painted with great skill entirely in gloss or shiny colours, they seem to me to resemble fine pieces of porcelain rather than realistic representations of the prototypes. Of course, gloss is used a great deal for painting small wargames figures, but this is to give durability of finish against the hazards and injurious

effects of constant handling, and not primarily for appearance. Therefore I prefer to use matt colours for my painting work, with semi-gloss to simulate the texture of such things as boots, belts and equipment. Even for highly polished details I find that a sparing coat of clear varnish over a matt colour is more successful than a straightforward gloss.

Most of my requirements are met by the Humbrol range of Matt and Railway (semi-matt) Enamels, whilst for the brilliant shades of full dress uniforms and the like, I use the Rose Models series of oil-bound water paints. These latter are applied thinned down with water, but when dry they give a bright matt effect which is completely waterproof. Rose Models also supply several metallic paints in the form of powders which are mixed with a medium, and these can simulate gold, brass and bronze better than anything I have yet come across. Humbrol 'Silver' and 'Steel', with a little black or blue added to give the right shade, are ideal for representing white metal. For a life-like effect when painting horses (except greys, which are always matt), I use artist's oil colours, thinned down with turps. Alternatively, semi-matt Railway Enamels give a nice sheen, resembling the coat of a well-groomed horse.

In my opinion it is necessary to give models a thorough undercoat of matt white in order to obtain the best results, with matt yellow as the undercoat for detail to be finished in gold, brass or bronze. This has a dual purpose, in that it forms a better key for finishing colours as well as giving them brilliance of tone. I frequently use an emulsion paint for this undercoat.

Good brushes are essential for the best results, and if they are properly cared for will last for a surprisingly long time, more than repaying the extra cost of purchase. Sizes of brushes to be used are



Two views of the Life Guards officer in stable jacket; note the careful pose of the legs and the gold braiding on the jacket.

very much a matter of personal preference, but a little experimentation will soon establish which are the best for your own style. Most of the well-known manufacturers of artist's materials make high quality sable water-colour brushes and these are the ones I use, in sizes 1, 2 and 3 for general use, large areas of colour and undercoating, and in sizes 0 and 00 for faces, small detail, and lining in.

Before applying the undercoat to a polythene figure, it is best to give it a complete coat of Unibond, a water-soluble adhesive which when dry sets transparent to form a hard impermeable overall surface on which colours will take and adhere in a completely satisfactory way.

Try to work out for yourself a definite sequence in painting a figure, and stick to it as far as possible in all cases. This will ensure that no detail is overlooked, and will also help to minimise the number of times that you have to wash your

brushes in order to change to another colour. My own sequence goes like this: (1) Face. (2) Tunic. (3) Trousers. (4) Headdress. (5) Equipment and weapons. (6) Boots. (7) Buttons and buckles, etc. (8) 'Lining in' of detail. (9) Stand.

At stages 2 and 3 I emphasise creases and folds in the material by using a lighter shade of the base colour to highlight ridges, and a darker shade to denote the shadows. The darker shade is also employed in stage 8 as a fine line around details to give them more emphasis. This, in fact, gives a false exaggeration to the shadows which would be thrown on clothing by natural light. Shadows and highlights do appear on the model even if you don't shade in as described, but as the figure is so small, natural shading hardly shows, hence the need to help out the effect with your paintbrush.

As with the making of a model, patience is your principal ally in achieving a satisfactory painting job, and this quality, plus plenty of practice, will enable you to perfect the technique that suits you best.

The two conversions this month are representative of both ends of the scale, one complex and one simple:

#### Conversion 1

This is for a Life Guards Officer 1890, in stable jacket. Parts required: 1 pair Historex standing legs in plain leather boots; 1 Historex plain body, without coat tails; 1 pair of arms, Historex or Airfix; 1 Historex sword-Cuirassier's straight sabre; 1 Rose Models head in peaked pill-box cap; Plastic card strip.

Commence by taking the two legs and trim off the boot flaps to give the 'Butcher' boot shape (Fig 2). Then remove approximately 3 mm from the top (waist) of each leg, and join them firmly with polystyrene cement. Next fix the body to the leg section again with polystyrene cement and allow the whole to dry thoroughly. When this has taken place, sand down and carve to the stable jacket shape (Fig 3). Now drill out the neck to accept the spigot of the metal head. Carefully erase all flash marks from the head, and join it to the body, turned to one side, using Araldite. This adhesive

Front and rear view of the Russian officer, a simple but most effective conversion from the basic Airfix figure.



Life Guards officer model shown from the rear to give position of pouch and sword slings. HO/00 cork ballast is sprinkled over glue on the base to give the effect of gravel.

should be used in sufficient quantity to form a collar around the neck when completely set hard. Next cut a 25 mm x 25 mm piece of lead, brass or copper sheet, 1 mm thick, and join it with Araldite or Universal adhesive to a piece of plastic sheet of the same dimensions. This makes the base, to which the figure should now be joined (Fig 4).

Now carefully assemble the Historex sword, and cut approximately 2 mm from the tip of the scabbard. Cement the hilt of the sword to the left hand and join the left arm to the body, following this with the right arm. Using the dimensions in Fig 5, make the pouch and pouch-belt and cement these to the body. Cut the shoulder straps from a strip of plastic card and fit them into place, smoothing them down at the seam end when dry and set. Finally, from a 1 mm wide plastic card strip cut the sword slings, fitting them carefully into place at the lower edge of the jacket and into the rings on the sword scabbard. Check that all operations have been completed, smooth all joins, and paint. This makes a very attractive figure, very representative of the elegant cavalry officers of the period.

#### Conversion 2

This is for a Russian infantry officer in field service dress, 1944. Parts required:

##### COLOURING DETAILS

#### Conversion 1

**Cap:** Dark blue, with scarlet band and welt around crown. A gold woven design on top. Peak shiny black, with gold edge.

**Stable jacket:** Scarlet, with dark blue collar, cuffs, and shoulder straps. All lace is gold. Buttons gilt. Badges of rank silver.

**Pantaloon (breeches):** Dark blue, with scarlet stripes down outside seams. These stripes consist of a central narrow scarlet welt, flanked by a wider stripe on each side (see photos).

**Shoulder-belt:** White, with brass fittings, and a dark blue central stripe.

**Pouch:** Shiny black, with gilt device.

**Sword slings:** White with gilt buckles.

**Boots:** Shiny black with silver spurs.

**Gloves:** White.

#### Conversion 2

**Helmet:** Khaki.

**Blouse and breeches:** Khaki.

**Belts and equipment:** Semi-gloss brown (leather).

**Boots:** Black, semi-gloss.

**Buckles and buttons:** Brass.

**Shoulder-boards:** Khaki, with magenta piping, and silver stars.

1 Russian Officer from Airfix 54 mm set and 1 steel-helmeted head from standing 'burp' gunner from same set.

For this conversion I am indebted to my son Anthony who, on being presented with a set of 54 mm Airfix Russian Infantry, pointed out that whilst all the other ranks were snugly fitted with steel helmets, the unfortunate officer, gazing steadfastly through his binoculars, was not equipped with this most desirable combat item. I accordingly set to work to remedy this defect, and also to lower the binocular arms to a more comfortable position.

Remove head and arms from officer, cutting carefully at the shoulders to leave arms and binoculars complete in one piece (Fig 8). Make sure that the neck surface is completely flat. Now cut the head cleanly from the standing 'Burp' gunner, and trim off any flash, also checking that the neck is perfectly flat. Using a length of household pin as a plug, fit the head to the officer's body with Humbrol Universal adhesive (Fig 9). Next trim the binoculars to shape (Fig 10), and fix the arms back on to the body using a length of pin at each shoulder and Universal adhesive. Allow the whole assembly to dry thoroughly for 24 hours, then cut two shoulder boards from sheet plastic and stick them to the shoulders of the figure with the Universal adhesive (Fig 11). Make sure that all joins are carefully smoothed down with clean cuts from a sharp knife, then coat the figure with Unibond. Allow to dry thoroughly before painting.

#### 'Hall' class—from p. 17

becomes a relatively easy matter to carve the rest of the plastic away. I used Isopon to fill in the gaping hole which is left and 10 thou plastic card can also be used to complete the tops of the splashes and the reversing lever on the offside. Engraved brass nameplates were purchased and glued with Britfix Epoxy Adhesive to plastic card backing pieces which were then cemented with polystyrene cement to the top edges of the splashes. In case you are not sure, the nameplates should be right on the outer edge of the splashes.

There are a number of other things that could be done. For example, the cylinders are 2 mm too short in length and the cross head and slide bars could be replaced by nearer to scale patterns. A crosshead pump can be fitted to the offside which can be nothing more than a length of plastic sprue cemented to the lower edge of the footplate. Vacuum pipes, lamp brackets, screw couplings and glazing for the cab are other obvious improvements. Last of all, 'Great Western' can be added on the tender, though the model as currently sold already has this feature. Finally, the coupling rod can be filed down to remove the unprototypical fluting, but if you are unsure of your ability to do this, I suggest you leave this feature unchanged.



# AIRMODEL KITS

Plus other recent modelling developments, reviewed and discussed by Alan W. Hall

MY recent trip to Germany brought me in touch with a number of that country's leading model makers and I was, perhaps, surprised to find that the methods they employ, particularly in aircraft modelling, are in some cases in advance of the general trend in Great Britain.

One of the reasons for this is probably the fact that the German retail trade has access to foreign products from the United States and Japan in more readily available quantities. At the same time they have a few good ideas of their own which are worth recording.

## Conversions in quantity

I was particularly impressed by the work of Herr Franz Schaedler, a Karlsruhe civil servant, who recently started the company known as Airmodel and at present is producing a number of plastic conversion kits for existing aircraft models.

It did not take me long to realise that here was something that could lead to a new trend in kit work which would be as prolific as the recent rash of new transfer manufacturers in the UK. There must be many modellers who would greatly love to do conversions but have neither the time or the facilities. At the same time the gulf that exists between the newcomer to the hobby and the practised exponent of the art of kit conversions is very great.

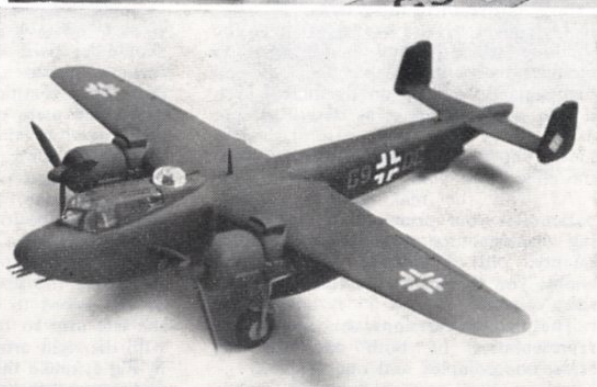
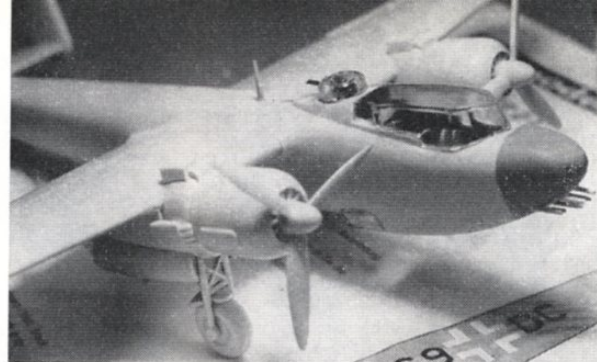
Many modellers in Britain, for example, do not go beyond the stage of making a very good representation of the model produced by the manufacturer but no more than that. They may change the markings, do a revised paint job and perhaps modify small outline details, but few go further. Visits to IPMS meetings prove this point where there are relatively few conversions at the monthly competitions and even fewer amongst the younger model makers.

Airmodel have realised this need for an easier method of getting people to take on the more major surgery jobs and have to some extent satisfied the need. Gone are the days of burned fingers trying to get a canopy to mould correctly, gone, too, is the mess left on the floor after an evening chipping away at a block of balsa wood or plastic scrap. These new Airmodel kits provide the necessary parts to make the conversion and are now even supplying the transfers as well.

I forecast that there will be increasing interest in this aspect of model making in the near future. The trend will obviously satisfy many people who have not previously made many conversions and already I have noted that at least two other companies in the United States have started limited production.

I would also suggest that the younger model maker can greatly enlarge his scope and abilities by trying some of these conversions. They are simple to do and the finished product is far more satisfying than simply producing a model straight from the box in exactly the same markings as many thousands of others. In my opinion plastic modelling starts with conversion work, takes the hobby away from being a child's toy and gets us back to the skill and artistry which existed before the advent of the plastic kit. The conversion kits now being produced by Airmodel and others are the stepping stone between sticking the kit parts together and producing the superb models which are made by the few and are the envy of us all.

In the last year Airmodel have marketed nine conversion kits, mostly of last war Luftwaffe aircraft, and all involving some aspect of conversion work which would normally call for a high degree of skill in moulding new canopies or making up tiny radar aerials, in most cases too difficult for the newcomer.



Simplest of the Airmodel conversion kits is this Do 217 J-1. The new nose can be seen in the top photograph and the completed all-black model is in the markings of NJG 1. It should be ideal for beginners, though this particular conversion happens to be quite easy—using a balsa nose—even without the benefit of a kit!

For example, the latest conversion kit, that of the Dornier Do 217K-1, is almost impossible for the inexperienced because the bulbous glazed nose of this aircraft involves a very complicated amount of acetate sheet moulding. Simpler things such as a two-seat Lockheed F-104F have also been produced but again needing canopy moulding, so difficult for some.

Each of the conversion parts are moulded in polystyrene matching the material of the basic kit. An instruction sheet is provided with details in both German and English. The last two products also have excellent transfer sheets well up to the standard of some of the best produced by the 'big boys' in the manufacturing world.

## High price

About the only criticism I have heard of the Airmodel products is that of price. Most of the kits cost 7s 11d in Britain, almost twice that of the basic kit, and the two latest are nearly ten shillings. Why should this be? . . . the reason is simply one of quantity. Whereas Airfix may produce anything up to a million off any one mould (their methods also being geared to production line techniques), the small man can hardly expect to produce more than a few thousand from his. All of the overheads are

One of the Airmodel non-Luftwaffe conversion kits produced is for the Mirage IIIR. This model was completed using the ABT transfer sheet. The underwing tanks came from an Airfix Skyraider kit and are not supplied.



exactly the same, apart from the wages bill, and therefore the unit cost comes out much more.

I agree that the price of the conversion kit is very expensive, particularly for the youngster. They will, however, not come down until the demand goes up, the range increases and the popularity of doing conversions is greater. Add to the basic price the wholesaler's and the retailer's profit margin, import duties in this country, tax, packaging and advertising, and you will soon see where the costs go. The manufacturer gets a very small percentage of the retail price.

Models so far produced by Airmodel include:

Conversion	Basic Kit	Cost	Comment
Dornier Do 217J-1	Airfix	5s 11d	Ideal for beginner, simple to build
Heinkel He 111 H4	Airfix	5s 11d	New upper and lower turrets moulded in clear plastic New engine exhausts
Me 262 B-1a/U1	Airfix	6s 11d	Radar array, new canopy, D/F loop and radio aerial. Slightly more difficult to make
Mistel	Revell Ju 88/ Frog Bf 109	7s 11d	Parts for new Ju 88 nose and Bf 109 cradle. Most popular conversion
Messerschmitt Bf 110	Airfix/ Monogram	5s 11d	New engine exhausts and intakes. Radar array
Lockheed F-104G/ F-104A	Airfix	7s 11d	New fin and rudder for 'A' model. New canopy and second seat for 'G'
Mirage IIIR	Airfix	7s 11d	New nose, fuselage extension and jet orifice
Dornier Do 217 K-1	Airfix	9s 11d	Complete new nose in clear plastic. Includes markings for III/KG2
Dornier Do 17P1	Monogram	9s 11d	Complete new nose in clear plastic. Includes markings for 3(F) Nacht Ostfront 1942

Other new kits announced for release include a Ju 88P-1, Ju 88S-1, Ju 188A-2, Ju 88G-1, Ju 88C-6, Messerschmitt Bf 109B, Messerschmitt Bf 109K and Messerschmitt Bf 109G-12. Airmodel are also looking into the possibilities of producing their first complete kits. The two so far announced are the Henschel Hs 126 and DFS 230 A-1. Conversion kits for the Hunter T7 and Gannet AEW3, previously rumoured, will probably come later.

There are at present only a few retail stockists in Britain. The pioneers are Argyle Models in Scotland and, more recently, Dri-Dec (19 Market Street, Newbury), and our old friends at BMW Models, Wimbledon, have become stockists. As the fashion increases there are bound to be more.

## Other items

I saw several new products being used by German model makers which, although they have been in use in the States for some time, were new to me. I found one of the most useful of these to be a material called Magic Masker. This can be used to mask out areas on paintwork to achieve a hard line without using Sellotape. I saw examples where the clear areas of a canopy were painted over with the material and the framework roughly painted on. When the paint is dry the masking medium is simply rubbed off and fine sharp lines are left. Similarly, cheat lines can be put in using this method. It works just as well on silver paint as any other and can overcome that tremendous problem of masking silver and having the base colour come off as soon as the tape is removed.

Another American product seen was Super Micro-set. This is used to 'soften' transfers so that they adhere to the surface better and at the same time mould to the rivet or contour lines on the model. Have you tried getting the crosses on the wings of an Airfix Ju 52 recently? If you have you will know how difficult this can be as the transfer will not go into the small ridges of the surface detail. Super Micro-set solves these problems and also sets the transfer on to the surface with a far greater efficiency than by using the adhesive already there. Similarly, you can remove old transfers by giving them a coat of this material.

September, 1970



One of the most popular of the Airmodel kits is this Messerschmitt Me 262B-1a/U-1. The conversion kit is intended for the Airfix model and contains radar aerials, new canopy and D/F loop aft of the cockpit.

For matting transfers the Germans use Testor's Dullcote. This again is an American product but a very efficient one. I saw how a glossy subject which when cut out closely round the outline could be sprayed with this aerosol can liquid and within 30 minutes completely lose any shine it may have previously had. When dry the transfer is immersed in water in the normal way. Care has to be taken in application as too much of the Dullcote will cause the transfer to shrink and crackle on application.

A new rapid bonding adhesive called Cyanolit has recently appeared on the German market. This comes in a very small phial and will stick anything apart from polystyrene plastic. I saw how it joined balsa wood so that the wood broke instead of the joint, how it will bond metal including fuse wire for small radar aerials and how useful it can be in a great variety of ways to the model maker. Only a very small amount is needed and the adhesive is expensive. For a number of important uses there can be no alternative as there simply is nothing to compare with Cyanolit on the market.

Franz Schaedler uses two products which are German produced. The first is a polishing paste called Polierpaste for buffing up canopies and applying a final polish to a clear dope and talcum powder filler mixture. I was shown how it is possible to completely transform an old canopy or one that is not too good when it comes from the box. The difference after a few minutes' hard rubbing was amazing. It can only be used on crack-free items as the slightest split in the clear plastic will show.

The other product used by Schaedler is perhaps the most important of all. This is a plastic paste which when joined by a hardener will produce a rock hard plastic suitable for moulding, filling wing joint gaps and many other jobs. It can be filed, cut with a knife, sanded or sawed without cracking or shrinking. The material is ideal for the plastic conversion kit addict as it gets away from the plastic body putty and plastic wood so many of us use and has much better properties than either of these. I saw, for example, how to mould with the material. Franz Schaedler showed a perfect impression he had made from part of an existing kit now on the market.

Engines could be copied, wheels repeated in perfect precision, all without having to buy another kit. I can thoroughly recommend this material to all model makers who want spare parts or even those who have a problem in finding a suitable material for filling cracks in joint lines.

Prices for these products were given to me in Deutschmarks and Franz Schaedler has agreed that he can supply any of them if model makers care to write to him. His address is Schweidnitzer Strasse 11, D7500, Karlsruhe 1, Germany. An international money order is needed, plus postage.

Prices are: Polierpaste DM6.65; Super Micro-set DM4; Testor's Dullcote DM4.95; Cyanolit adhesive DM3.95; Magic Masker DM3.65; Plastic paste—prices on application.

The Germans have become so interested in recent months in plastic model making that a new magazine has recently been started for the enthusiast. Slightly larger in page size than *Airfix Magazine*, it is produced on a bi-monthly basis and has articles on all types of plastic modelling including aircraft. Colour scale drawings of Luftwaffe types are included in the first two issues and conversion articles also appear. It is hoped to include English translations of some of the text in the future. Known as *Plastik-Modell*, it sells for DM2.50 in Germany.



# Fire Control

A GUIDE FOR MODELLERS OF BRITISH WARSHIPS,  
MAINLY 1939-45 PERIOD

by Peter Hodges

THE FIRST part of this article\* covered the introduction of the Director system to British warships and dealt principally with the development of Director Towers and Director Control Towers associated with the Fire Control of surface weapons.

This month, the background to the directors employed in anti-aircraft control, as well as those adapted to fill a dual-purpose rôle will be traced.

As a preliminary, it is worth mentioning that before and during the second world war, the equipment which made up the 'anti-ship' armament was known as Low Angle, or 'LA'; and that associated with anti-aircraft fire, as High Angle, or 'HA'. Post-war, this was changed to 'SU'—for surface—and the self-evident 'AA'; and at about the same time, the use of Roman numerals to distinguish the various marks was abandoned in favour of Arabic numbers. (For example, 'HA/LA Mk VI' became 'AA/SU Mk 6').

## POST 1919 DEVELOPMENTS

The potential of the military aircraft had been clearly demonstrated in the first world war, but during it no concerted effort was made to provide a solution to the fire control problem involved.

This in itself was difficult to solve for several reasons. The targets were already many times faster than those on the surface; they were considerably smaller; and their position relative to the firing ship was three- rather than two-dimensional. When one adds the extra complications of the aircraft's high manoeuvrability and that its speed could only be estimated, it will quickly be realised that the likelihood of scoring a direct hit on a distant airborne target was remote.

With this in mind, two forms of AA defence were evolved. The first was long range predicted fire using a time-fused projectile, set to explode in the vicinity of the target and produce a lethal 'volume' of splinters in the sky; and the second was close range fire using contact-fuse shells. In fact, the design of the time-fuse nose cap was such that it would also explode on contact, should the predicted trajectory be sufficiently accurate. In the case of the close range projectile, the fuse was designed with a 'graze' contact so that it was especially sensitive and would be detonated even if it merely 'brushed' the target.

Since the close range weapons were to fire these contact-fuse shells, it followed that to increase the hit-probability, they should have:

- (i) a high rate of fire
- (ii) multi-barrels wherever possible
- (iii) ammunition for sustained fire
- (iv) high elevation and training speeds.

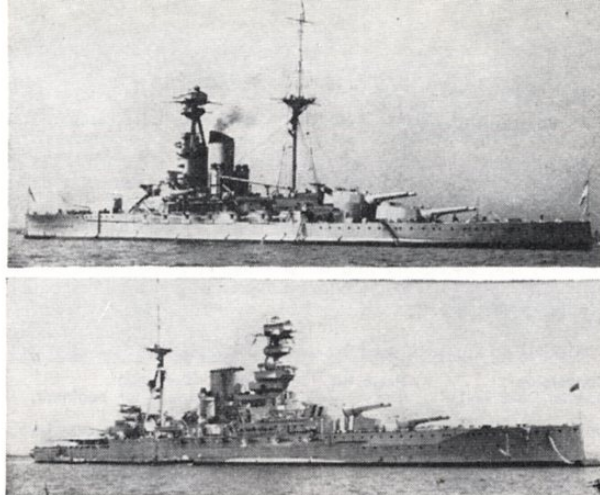
These requirements led to the development of the 'pom-pom' style mountings but for the moment, they need not be investigated further.

The problems involved in predicting the future position of a manoeuvring target, flying at an unknown speed and at a changing height, were so severe that no attempt was made to solve them. Instead, the assumption was made that a high level bomber would have to remain on a constant course, at a constant height and at a constant speed if he were to hope for a successful attack. For, of course, the bomb-aimer had his problems, too.

The 'strike fighter' did not exist in those days and little damage was envisaged from an attack by the contemporary fighter planes. On the other hand, much concern was felt regarding defence against low-flying torpedo bombers, and if these escaped the long range fire, they were to be engaged by the close range weapons. It will be observed that the dive-bomber, which was to become such a menace, was not considered; and it was fortunate indeed that it could be engaged by the existing close-range guns—although these were frequently lamentably lacking.

## PREDICTED ANTI-AIRCRAFT FIRE

Accepting the height-speed-course constants (which were justified insofar as the high level bombers were concerned), work commenced on the design of a control system to be capable of calculating the future position of the target and converting this into terms of Gun Training, Gun Elevation, and Fuse Setting. As we have seen, it was



Top: The battleship Resolution in July 1935 with the first HACS arrangement, the director being visible above the Spotting Top on the foremast. Above: Battleship Barham in 1938 with the 'doubled up' HACS system on the centre line. One director remains atop the Spotting Top, the second director being on the platform between the mainmast legs.

too much to expect the trajectory to pass exactly through this future position but the shell had to burst close enough to inflict lethal damage. The well-proven Director System was used to control the guns and the arrangements were known as the High Angle Control System, or HACS.

## THE HACS DIRECTOR

This was an integral part of the system as a whole and usually carried the same mark number as its associated HACS table. All the directors were fitted with a range finder instrument but in this application it was known as a Height Finder. It did, of course, measure range, but height is a simple trigonometrical function of range and elevation and could be easily determined provided that the latter quantity did not fluctuate. This, it was bound to do because the director layer would need to constantly counteract ships' movement in a seaway, so a gyro-stabiliser was fitted, either in the calculator position, or in the director elevation drive. This stabiliser 'ironed out' any fluctuating movements and fed a steady 'Angle of Sight' into the calculator.

## THE HACS CALCULATOR

The calculator used mechanisms broadly similar in principle to those of its Surface counterpart but designed around the special requirements of AA control. It transmitted Gun Elevation and Gun Training quantities away to the long range AA guns and in addition, a Fuse Number, to which the shell nose-caps were set. At first, the fuse-setting was carried out by hand but later, fuse setting machines were evolved which did the job as accurately, and much more quickly.

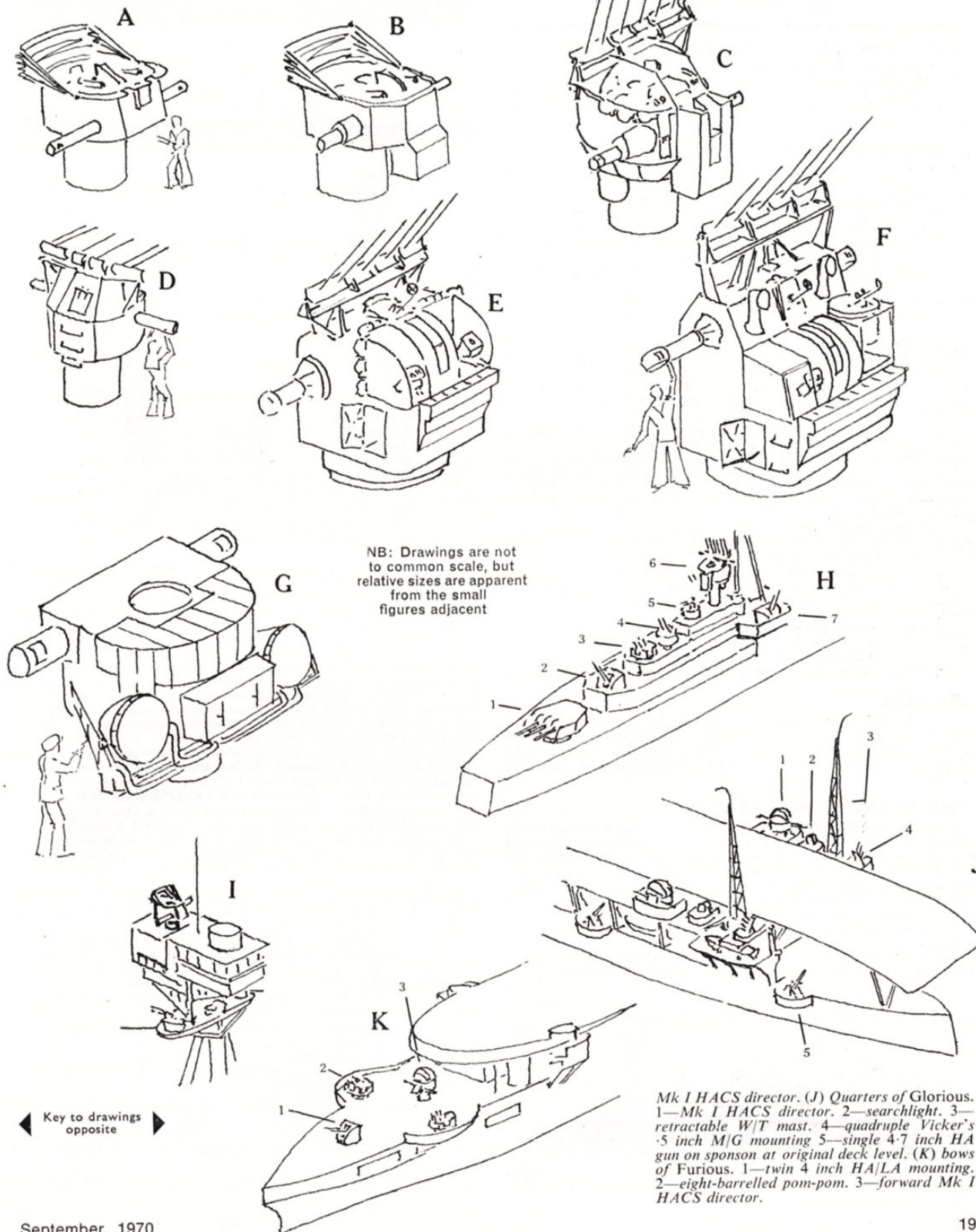
The HACS was the standard long range AA system for all capital ships, aircraft carriers and cruisers throughout the second world war and suitably modified to accommodate increased target speeds—and to control remote power control gun mountings—remained in service for some years after 1945.

## EARLY HACS INSTALLATIONS—BATTLESHIPS

The 'Queen Elizabeth' and 'R' class battleships (and their contemporaries) had been designed long before the HACS emerged and in consequence had their systems 'tacked on' in the 1920s and 1930s. One system per ship was provided initially but in due course most ships had two. Both were on the centre line, set as high as possible and able to control either AA battery. When the system was

Continued on page 20

Key to drawings: HACS directors (A) Mk I, HACS. (B) Mk III HACS. (C) Mk IV HACS and Mk IV HA/LA plated in over Control Officer's position; radar added plus new crew compartment forward. (D) Mk II HACS. Access hatch in rear plating and radar added. (E) Mk V HA/LA. (F) Mk V (M) HA/LA, with special independent look-out sight on left side. (G) Mk VI HA/LA director with twin radar nacelles, totally enclosed structure and central retractable independent look-out sight. (H) Rear superstructure of HMS Swiftsure: 1—'Y' triple 6 inch turret. 2—centre line twin 4 inch HA/LA mounting. 3—'Quad' 2 pdr pom-pom mounting. 4—pom-pom director. 5—6 inch barrage director. 6—after Mk IV HA/LA director. 7—starboard after twin 4 inch HA/LA mounting. (I) 6 inch Spotting Top in Eagle with



NB: Drawings are not to common scale, but relative sizes are apparent from the small figures adjacent

Mk I HACS director. (J) Quarters of Glorious. 1—Mk I HACS director. 2—searchlight. 3—retractable W/T mast. 4—quadruple Vicker's .5 inch M/G mounting 5—single 4.7 inch HA gun on sponson at original deck level. (K) bows of Furious. 1—twin 4 inch HA/LA mounting. 2—eight-barrelled pom-pom. 3—forward Mk I HACS director.

\*June 1970 issue, page 480



## Fire Control—continued

doubled-up, the original forward HACS director was retained above the Spotting Top on the foremast (a long climb to Action Stations!) and the second director was sited on a platform abaft the mainmast. *Nelson* also had two systems but in her case both HACS directors were on the centre line close together, abaft the DCTs on the main superstructure.

### AIRCRAFT CARRIERS

The arrangements in the old aircraft carriers were very variable. Both *Eagle* and *Hermes* were weakly armed with single 4 inch AA guns—four in the former ship and only three in the latter—and rather unnecessarily retained their larger calibre surface weapons. *Furious*, too, originally had a mainly surface-weapon armament of ten 5.5 inch guns of a similar model to those in *Hermes* and *Hood* but just before the war these were replaced by twin 4 inch HA/LA mountings. The revised layout included two separate HACS systems, with one director on the centre line, immediately below the forward end of the foreshortened flight deck, and the other on the diminutive 'island' which was finally added to her originally flush deck.

The most realistically armed carriers were *Courageous* and *Glorious*, both with sixteen single 4.7 inch HA guns, arranged fairly equally along the ship's side on the level of the original upper deck. These were controlled by four separate HACS Mk I Directors carried on projecting sponsons at flight deck level in the four 'corners' of the ship.

This was a very viable arrangement and was adopted in principle for the New Construction carriers starting with *Ark Royal*. Unfettered by the limitations of an existing non-carrier hull, as had been the case in all the earlier ships (except little *Hermes*), the designers were able to arrange the guns into groups of two twin mountings in each 'corner' and at the same time build their sponsons higher, to give better 'sky arcs'.

It was both tragic and ironic that the two best-armed of the old carriers should be sunk early in World War 2 by submarine and surface vessels, when they would doubtless have given a good account of themselves had they been subjected to air attack.

Of the pre-war Fleet Carriers, only *Furious* survived the war, spending it on very active service in the Home Fleet from 1939 to 1944.

To keep the deck edge clear for flying operations, the port side directors of the later New Construction aircraft carriers were extendable and could be raised to their action position by hydraulic rams. When not in use they were retracted below flight deck level.

### CRUISERS

Like the old capital ships, the first of the post World War 1 cruisers had one HACS Mk I Director on the centre line. In the 8 inch ships this was aft, but in the subsequent 'Leander' and 'Arethusa' classes it was moved forward superimposed above the DCT.

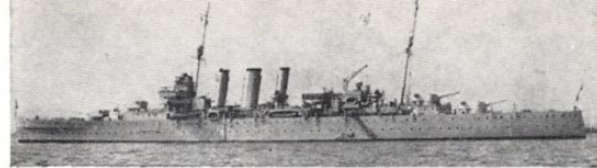
### 'ENDED' AND 'SIDED' LAYOUTS

Once the HACS had become established the single systems in the cruisers with twin 8 inch and twin 6 inch mountings were doubled up. Because their 4 inch AA batteries were 'sided', the single centre line director could only direct fire on one side of the ship at a time, but a second director could naturally control the opposite battery. Accordingly, the complete system-director, HACS Table and control circuits—was duplicated, and by the inclusion of change-over switches, it was possible for either director to control either battery.

When the second director was placed on the centre line of the after superstructure, the layout was known as 'Ended'; if the



Above: Uganda in 1943 with 'ended-sided' director layout. Right: Coventry as an AA cruiser in 1937 with Mk III director on Spotting Top.



Top: Cruiser Shropshire with original arrangement of one HACS Mk I director aft (abaft crane). Above: HMAS Australia in 1946 as modified with 'ended' HACS arrangement.

directors were sited on each side of the bridge, the layout was said to be 'Sided'. The table below shows some typical arrangements:

Table 1

Ship	Original position	Modernised arrangement
Norfolk	Aft	Sided
Devonshire	Aft	Ended
London	Aft	Sided
Shropshire	Aft	Ended
Sussex	Aft	Ended
Berwick	Aft	Sided
Cumberland	Aft	Sided
Achilles	Forward	Sided
Ajax	Forward	Sided
Leander	Forward	Not changed

Note: The Airfix Ajax kit components provide for her original layout (although the HACS Director forward is not well modelled). The box, on the other hand, shows her in her later modified state, with 'sided' HACS arrangements.

The next class of cruisers to be built after the two groups of 'Leanders' were the 'Arethusas'—a reduced version with three, instead of four, twin 6 inch mountings—and these were designed in the first instance to have an 'ended' layout. Its advantage over the 'sided' arrangement was that with the latter, the HACS directors were restricted to the 4 inch guns on their 'own' side, making the director somewhat less flexible.

There then followed a succession of cruiser classes and sub-classes all having a main armament of triple 6 inch mountings, and these had a combined 'Ended-Sided' arrangement. There were HACS Directors to port and starboard of the large main superstructure and a centre line director aft, working (via change-over switches) with two HACS Tables.

The second and third groups of the 'Town' class ships—*Manchester*, *Liverpool*, *Gloucester*, *Belfast* and *Edinburgh*—were given a second DCT aft for divided control of the 6 inch guns in surface fire, and their after HACS director was a standard unit. In the others, this after director was specially adapted to fill a Dual-Purpose role and in contemporary language was called an HA/LA director.

As before, it could control either 4 inch battery in the event of damage to the 'sided' directors forward; alternatively it could control the after group of 6 inch surface fire, the after 6 inch DCT being omitted.

The last sub-group of the 'Colony' class not only had three HACS directors, but also a third HACS calculating table, each table working with its own director.

Finally, the reduction of the main 6 inch armament to three turrets by design, allowed a fifth (centre-line) twin 4 inch mounting to be sited in the original 'X' turret position, but only three ships—*Swiftsure*, *Superb* and *Ontario*—were so completed.

These ships had comprehensive 'change-over' arrangements which enabled their after HA director to control

- (1) Either broadside 4 inch battery, with or without the after 4 inch mounting.
- (2) The after 4 inch alone.
- (3) The after 6 inch turret in 'Divided' main armament control.
- (4) All the 6 inch armament.

The after 4 inch had a three-way change-over switch linking it to the Port, Starboard or After Director, so that three twin mountings could be used from a common system-and-director on either beam.

Similarly, the three after 4 inch mounts could all be linked to the



Above: Delhi after refit in America was an exception to the usual Royal Navy style and carried US 5 inch guns and an 'ended' US Mk 37 fire control system as in contemporary US destroyers and light cruisers (all photos by P. A. Vicary).

after director in the event of a concentrated air attack from the quarters, leaving the other sided pair of 4 inch switched to their 'own' director.

### OTHER CRUISER LAYOUTS

Of the cruisers earlier than the 8 inch armed ships only *Emerald* and *Enterprise* were given an HACS system. *Frobisher* and *Effingham* were hastily equipped with twin 4 inch controlled by a Destroyer system, and *Delhi* was extensively refitted in the USA during the war, emerging with an 'ended' US Mk 37 system controlling five single centreline US 5 inch gun mounts; but the other 'D' class had to rely on their existing local gun control for their 4 inch single mountings.

The exception was those old 'C' class ships which were transformed to AA cruisers. They substituted their single 6 inch for a 4 inch AA battery (ten singles in the first conversions and four twins in the later) controlled by an 'ended' pair of HACS directors.

To this 'ended' layout, the 'Dido' class of 5.25 inch cruisers were built concurrently with the 'King George V' class battleships.

### LAYOUTS IN CAPITAL SHIPS

During the late 1930s a scramble started to re-equip the British Fleet, and as many capital ships as possible were taken in hand for modernisation, but the only three fully refitted in time for the second world war were *Queen Elizabeth*, *Valiant* and *Renown*. Of the remainder, the 'R' class battleships were little changed and only small changes could be made to *Repulse* and *Hood*. The battleships *Malaya* and *Warspite* were partially modernised but not to the extent of the first three, who had their existing 6 inch secondary armament completely removed, together with their original 4 inch anti-aircraft guns, and were re-equipped with 20×4.5 inch in ten twin turrets.

This layout was split into four groups rather like that in the New Construction Aircraft carriers, with two 'sided' HACS directors forward and two more aft. The HAC systems of the 'King George V' class battleships were similar.

### HMS 'VANGUARD'

The only real short-coming of this 'four cornered' arrangement was that like the 'sided' set up, the directors were confined to the control of the mountings on their own side. To overcome this, the positions of the directors in *Vanguard* were revised. She had centre-line directors forward and aft and in addition a 'sided' pair approximately amidships. In her case, however, they were the American Mk 37 directors; were not associated with the HACS and did not see any war service in the Royal Navy (except in HMS *Delhi*).

### HACS DEVELOPMENTS

During its lifetime, the HACS system progressed through four Marks, most of which had several sub-models and variants to suit the particular armament or layout concerned. As has been said, the Director was an integral part of the system, and its Mark corresponded to that of the calculator. An exception was the HA/LA Director Mk V, which was associated with the HACS Mk IV. The accompanying sketches show the appearance of various marks of director, whose allocations are given in the tables.

Mk I: This was the original, from which the later units were developed. It was open-topped, roughly circular in shape, and carried a crew of five. There were no power arrangements, but the trainer had a two-speed gearbox, which allowed him to slew the director rapidly to the bearing of the target. Both layer and trainer had monocular telescope sights and the Control Officer a binocular sight, all of which elevated together from the layer's handwheel. A take-off drive elevated the height finder at the same time.

When not in use, the director was covered by a canvas 'pram' style hood, and its open, exposed nature often made it uncomfortable to man in action.

Mk II: Various improvements were included in this mark, but its appearance was almost identical to the Mk I except that it carried a different model of height finder. As will be noticed from the table, it was not in service in many ships.

Mk III: This was much more widely fitted and was of noticeably different shape, being more elongated than the earlier marks. When fitted in the 'C' class AA cruisers, the director could be used to control the 4 inch guns in surface fire, if the occasion demanded, and for this reason an extra position for a sixth crew member was included in its slightly larger structure.

In due course, all three marks of director were adapted to take a 'fish-bone' style Radar aerial which was mounted on a frame work in the rear of the structure and elevated with the sights. An opportunity was taken to plate-in the rear of the casing to afford better protection for the Control Officer, and the pram-hood was removed. Instead a light girder framework was built forward and a canvas cover

Continued on page 31

Table 2. HACS Director Installations

Mark	Ship or class	Remarks
	15 inch Battleships and Battle Cruisers	Replaced by 'ended' Mk III systems in battleships
	8 inch Cruisers	Doubled up with Mk I systems ex-battleships
	Cyclops	Single systems
	Eagle	
	Emerald	
	Enterprise	
	Medway	
	Resource	
	Rodney	
	Furious	
	Courageous	
	Glorious	
I		'Ended' Four-cornered
II	Repulse	Single systems, later doubled in some
	Achilles	
	Leander	
	Neptune	
	Orion	
III	Hood	Single systems, doubled up later in <i>Ajax</i> and <i>Nelson</i>
	Nelson	
	Ajax	
	Adventure	
	Hobart	
	Perth	
	Sydney	
	'C' class AA cruisers, 'Arethusa' class, and 15 inch Battleships on refit	'Ended' systems, except in <i>Warspite</i> which had 'sided' directors on the main superstructure
	Southampton	'Sided' systems; after director added later in <i>Newcastle</i>
	Newcastle	Converted merchant ships
	Large AA Escorts	
IV and IV HA/LA	Maidstone	Single system
	Forth	Ended systems
	'Dido' class	
	Remainder of 'Southampton' class	Combined 'sided-ended'. <i>Newfoundland</i> , <i>Ceylon</i> and <i>Swiftsure</i> had three HACS tables; others two
	'Fiji' class <i>Swiftsure</i>	'Four-cornered' systems
	Queen Elizabeth	
	Valiant	
	Renown	
	King George V	
	Prince of Wales	
	Ark Royal	
	Victorious	
	Illustrious	
	Formidable	
V HA/LA	Duke of York	'Four-cornered' systems; <i>Anson's</i> directors later changed to Mk VI HA/LA
	Anson	
	Howe	
	Indomitable	
V(M) HA/LA	Indefatigable	'Four-cornered', in conjunction with interim Fire Control system
	Implacable	
VI HA/LA (later redesignated Mk 6 AA/SU)	Superb	Combined 'ended-sided', in conjunction with interim Fire Control system
	Ontario	In association with HACS IV
	Anson	Post-war, except in a few early 'Battle' class; range finder later removed
	'Battle', Weapon, 'Ch', 'Co', and 'Cr' class destroyers	'Sided', only; post war modernisation with re-designed electronic Fire Control system; range finder removed
	Birmingham	
	Newcastle	
	Newfoundland	
	Sheffield	
	Hobart	
	Mysore (ex-Nigeria)	
Mk 6* AA/SU	'Daring' class	Modified director with Radar nacelles raised and no range-finder; removed on modernisation in 1960s



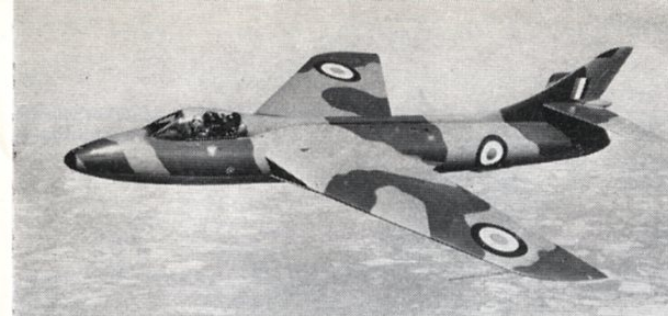
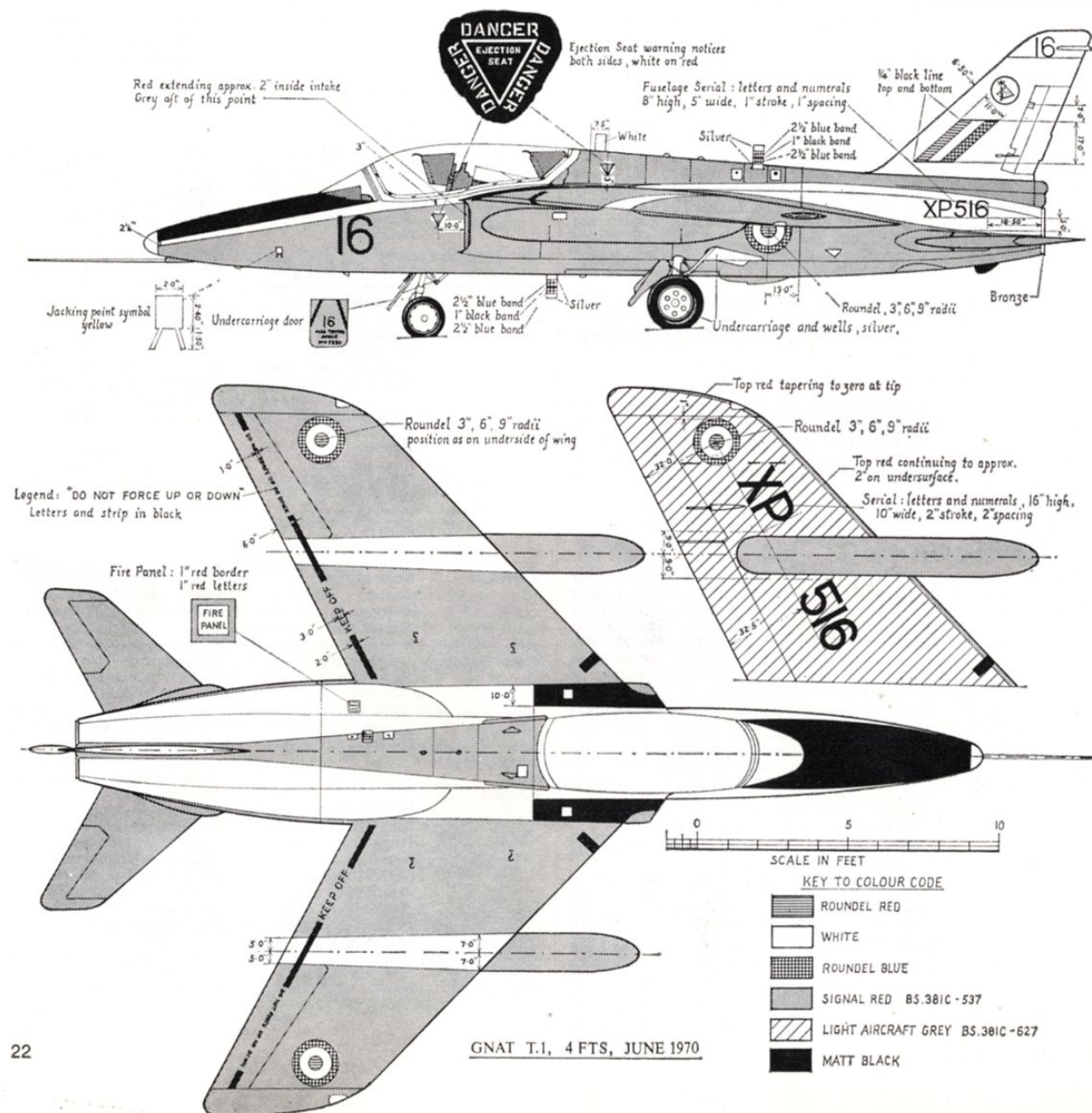
# New for Gnats

THE LATEST TRAINING  
COMMAND COLOUR SCHEME,  
DESCRIBED BY MICHAEL J.F.  
BOWYER AND DRAWN BY  
ALFRED M. ALDERSON

PROBABLY the most interesting machine—as far as markings go—to appear at the 1970 US Armed Forces Day displays was a Gnat T1 XM709 from CFS. It occasioned surprisingly little interest, but it was airing, for the first time in public, yet another new paint scheme, this time intended for all Training Command Gnats—except those of the Red Arrows team. That another trainer scheme, quite a costly affair, should emerge almost before the paint on the last one was dry is, to say the least, surprising. There are now basically six paint schemes on RAF trainers, many of them quite elaborate affairs.

The red-white-grey finish on Gnats, basically similar to that on the Jet Provost, is some two years old. No statement has yet been made as to why there was any need to make a further change, but change indeed has come. First the entire upper wing was painted grey; then came red, this latter colour wrapping itself around the leading edge to finish about four inches inboard on the under surfaces. Over the upper surface was applied a white chordwise band which displaced the wing roundel. This

Continued on page 33



Above and below: Views of the Hunter F1 in flight show the salient features of the type, mainly the altered nose and the straight leading edge, necessary in a kit conversion. Leading edge flaps are raised in the lower picture. Lower right: WT617 as drawn on page 25 when at DFLS in 1956.

## Hunter Trio

Modelling details for  
the Mk 1, the P1109,  
and the Hunter record  
holder aircraft

by Bryan Philpott



THE Hawker Hunter, which is now well into its second decade of RAF service, deserves a place in any collection showing the development of fighter aircraft. It is a pity, therefore, that this handsome but functional stalwart has been neglected by the kit manufacturers, for apart from the now rather aged Airfix Mk 6, and an even older Mk 1 from the Frog stable, the Hunter has not featured in any other manufacturer's range of 1:72 scale models.

### Hunter Mk 1

Although the Mk 6 was supplied in greater numbers than any other mark, the Mk 1 deserves to have its own niche as the first British-built swept-wing fighter to equip RAF day fighter squadrons, and despite its various shortcomings, has a very definite place in the Service's history.

Fortunately, to convert the Airfix Mk 6 back to the Mk 1 is not a difficult task, and is an ideal beginner's model as well as being attractive to the more accomplished modeller. This conversion also enables anybody who is looking for something a little different, to add a colourful variant to his collection.

The subject chosen is one of the early Mk 1s which, after squadron service, was used by the Day Fighter Leaders School (DFLS) based at the Central Fighter Establishment, West Raynham, during 1956. These aircraft were finished in standard day fighter camouflage of the period, with the exception that 'A' Flight aircraft had a red spine plus red bands on the wings and tailplanes, while 'B' Flight used yellow.

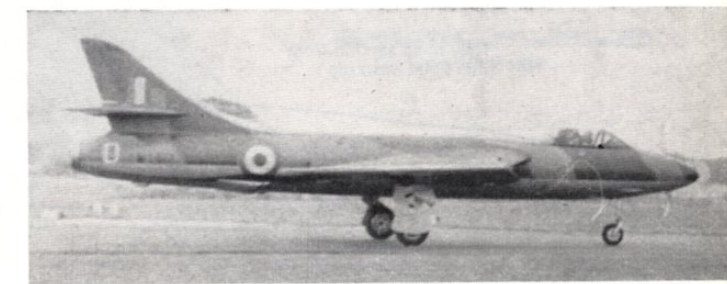
Some of these aircraft also had their nose wheel doors painted in their flight colours with the serial diagonally across them in white. In many ways the 'yellow' versions were more attractive and could provide some interesting deceptions of the eye. For in certain light conditions the yellow could appear to disappear into the background, giving the impression of a 'spineless' Hunter or one with its outer wing panels detached as it banked off the downwind leg on to final approach.

The main work to be carried out is to the wings and forward fuselage. I found it best to cement the two wing halves together and when they were thoroughly set, remove the saw-tooth leading edge with a sharp knife or razor saw. When this has been achieved it will be necessary to re-shape the leading edge to aerofoil section after filling any gaps left by the removal of the

unwanted saw-tooth. On my particular model only the port wing needed filling and this was soon accomplished with body putty.

The fuselage presents few problems although much hard work in sanding and filling is needed to obtain the correct contour when the ammunition link collectors are removed.

The fuselage halves are cemented together and part 32 is put in place. Parts 31, 33, 34, 30, 37, 38, 39 and 40 can be disposed of. I found it best to fill the gap behind part 32 with plastic card, although parts 35/36 can be used with the rear portion of the link collectors removed after the parts are cemented in position. After this it is simply a matter of filling with putty and sanding until the section added follows the same smooth line as the rest of the fuselage.



Fill the holes in the under-wing surfaces where the drop tanks and rockets on the Mk 6 are located, and if you feel so inclined, replace Airfix's original interpretation of the Martin-Baker ejector seat with a new one made up from plastic card or scrap plastic.

Humbrol Railway Colours were used on my model as these give a more authentic semi-gloss finish characteristic of the DFLS Hunters, which by no means had the high gloss finish now associated with current day fighters in their polyurethane paintwork. Roundels on my model were from an Almarks sheet with the serial and white 'O' coming from Blick Dryprint sheets.

To add a little more colour to your model, it is quite in order to put the black and white checks of 43 Squadron either side of the fuselage roundel as many of the DFLS Hunters came from

Continued on next page



## Hunter Trio—continued

that unit and were flown in their new paint scheme with the squadron markings for some considerable time. To do this the serial of the example shown would need to be changed, as to my personal knowledge, WT617 never flew at CFE wearing any former squadron markings.

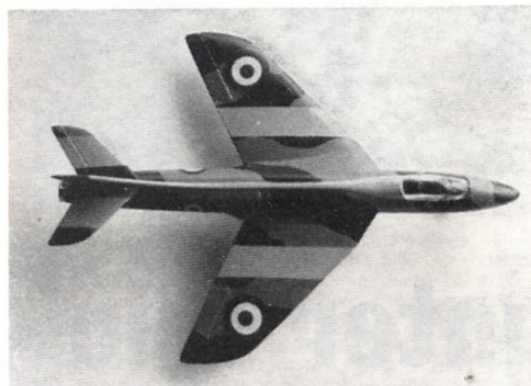
The same paint scheme can also be applied to the standard Mk 6 as this version was operated by the Combat Fighter School, although with this unit the red or yellow extended to cover the whole fin area, leaving the rudder silver or grey. The legend 'Combat Fighter School' in white must be added under the ejector seat warning triangle.

### The P1109

A simple conversion that will add another variant to a collection is the Hawker Type P1109. This was basically a Hunter Mk 1 with an extended nose and armed with two Blue Jay or Firestreak missiles plus two 30 mm Aden cannons.

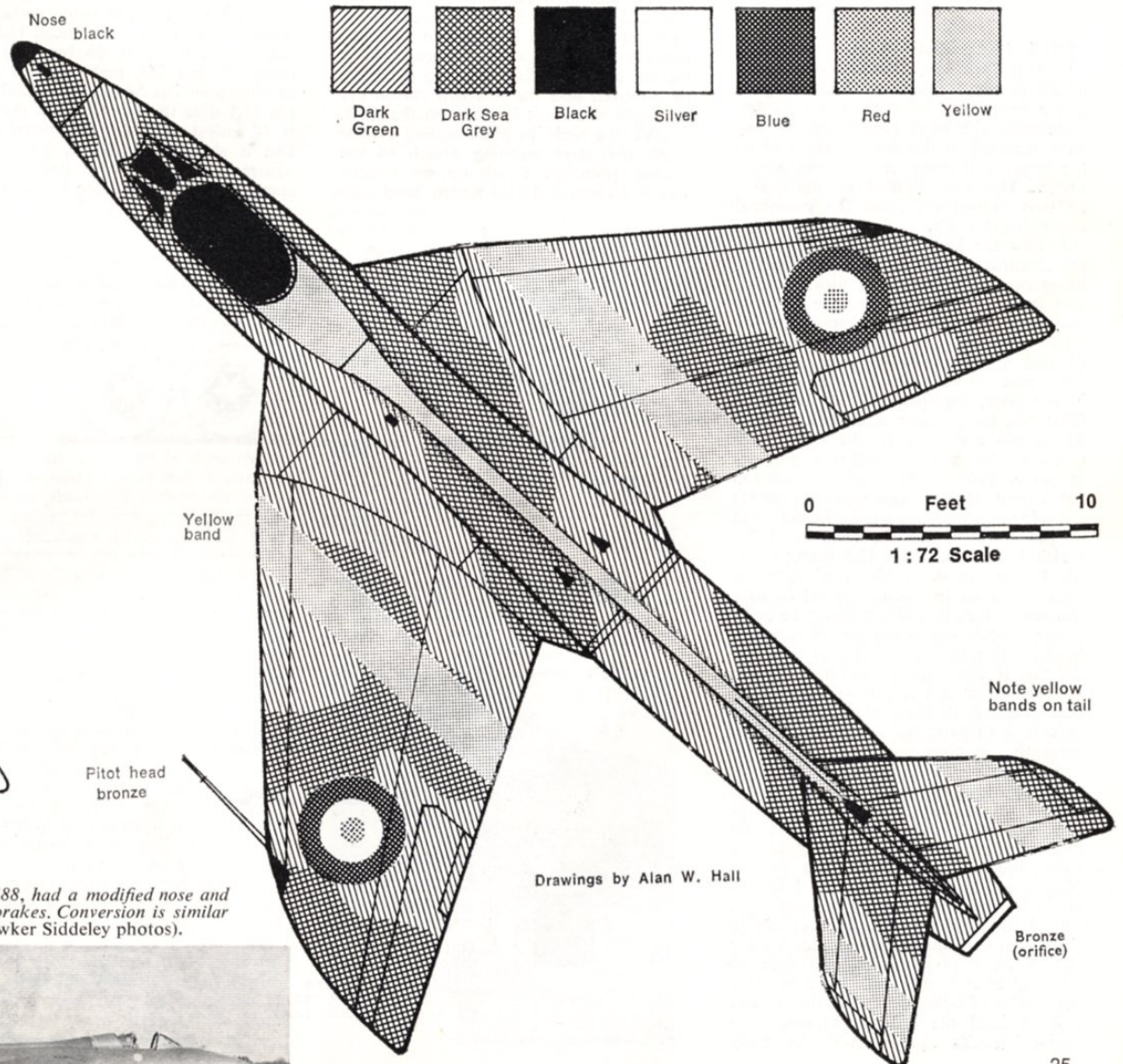
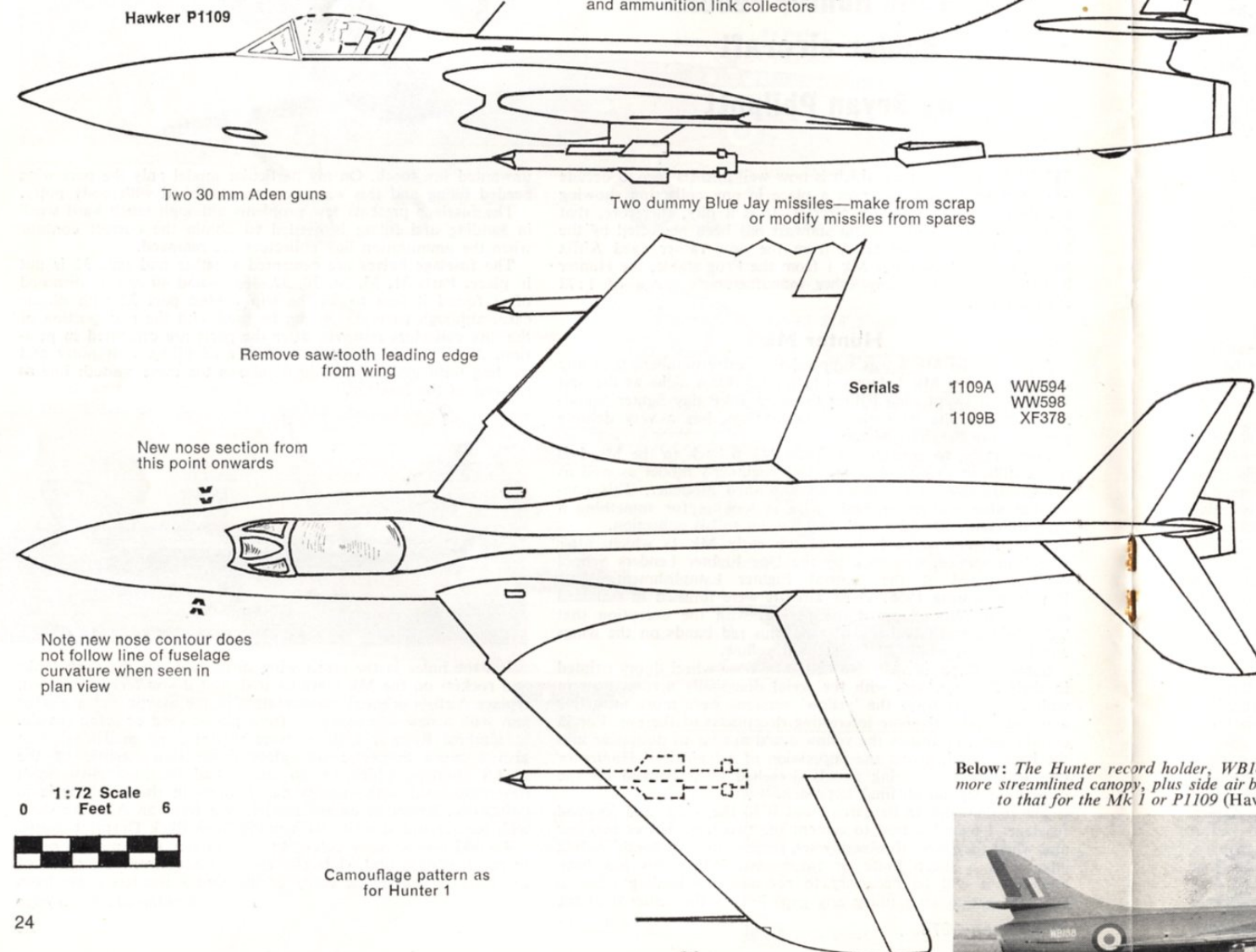
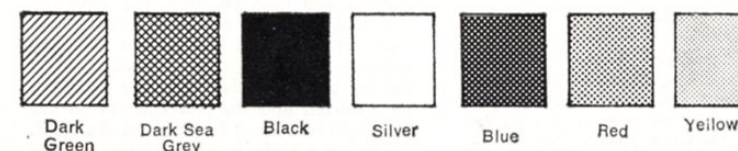
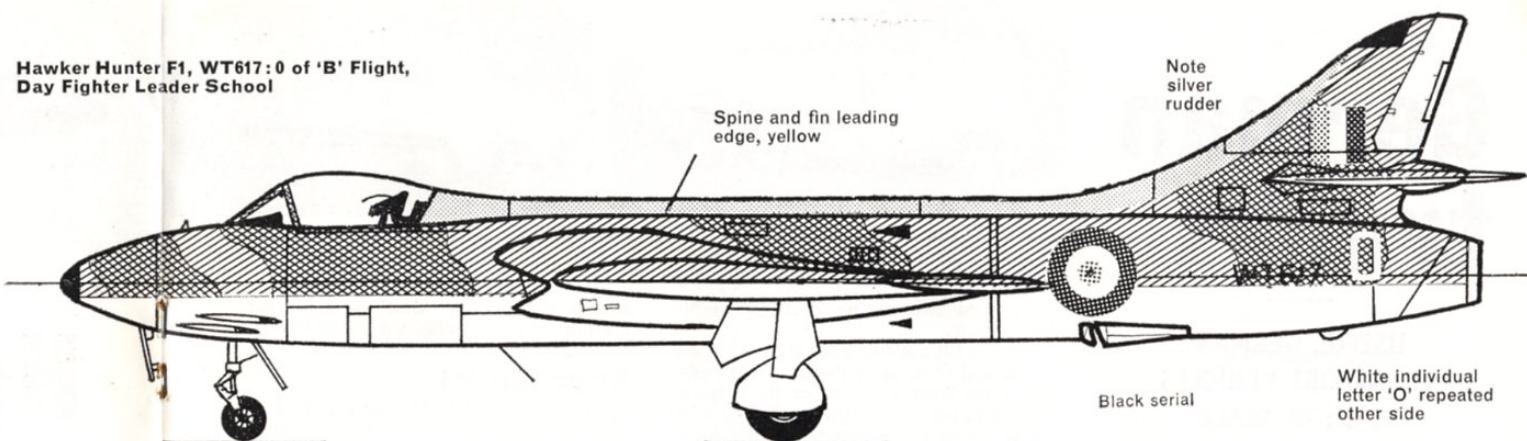
This variant never saw RAF service, but was used by the High Speed Flight for evaluation purposes on the TSR 2 project. The drawing shows the shape of the new nose section which has to

*Continued on page 36*

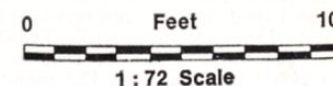
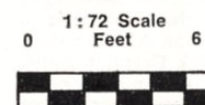


Above: Bryan Philpott's model of Hunter F1 WT617 as drawn opposite.

Hawker Hunter F1, WT617: 0 of 'B' Flight, Day Fighter Leader School



Below: The Hunter record holder, WB188, had a modified nose and more streamlined canopy, plus side air brakes. Conversion is similar to that for the Mk 1 or P1109 (Hawker Siddeley photos).





# German trucks

## USEFUL GERMAN TRANSPORT VEHICLES IN 1:76 SCALE BY GERALD SCARBOROUGH

THE Airfix Flak 88 Anti Aircraft/Anti Tank gun tractor, was the final model in the 8 ton series and was produced from 1937 to 1944. Later models were built with truck type bodies as they were replaced in the gun tractor role by the larger and more powerful Sd Kfz 8 and 9. This truck-bodied version makes an easy conversion from the personnel carrier/tractor kit.

Follow the kit instructions 1 to 8 for the construction of the chassis assembly, being sure to paint before fitting tracks, and leave to dry out. Remove the two rear seat locating ribs from the body floor (part 46). Cut off the sides (parts 44 and 45) vertically 13 mm from the front and assemble these in the grooves in the floor, together with the bulkhead (part 56), the radiator and bonnet (parts 57 to 60) and then fit the dashboard, steering column, wheel and seat (part 48) in place. For the back of the soft-top cab I used the back cover plate (part 51) cut down to the correct height and shaped to fit inside the roof hood for which I used the front 12.5 mm of part 66. It pays to do a 'dry run' with the back and roof to ensure a good fit with the screen top, etc. Don't forget to paint inside the cab and install the driver before finally fitting the back and roof in place. All that is now required to finish the cab is the addition of the 'canvas' doors from thin card or 10 thou plastic sheet, not forgetting to paint the inside faces before cementing in place.

The truck body can now be commenced and can be left open or fitted with a tilt as shown in the drawing. If you are going to leave it open, do remember to score the planking of the sides and ends on both sides of the plastic and to plank the floor. I find it easier to score the sides in one long strip, on 20 thou plastic sheet before cutting them out. Cut out the floor, allowing for the thickness of the sides, and stick all together after a 'dry run'. Hold in place with strips of Sellotape round the corners and to hold the bottom, making sure everything sits square. Add the body

Above: The two models described here seen in a wargames terrain. These are ideal to provide the necessary transport for wargames German armies and the half-track is particularly suitable to newcomers to kit converting.

irons from Microstrip or cut from 10 thou plastic.

For the tilt cut two ends from 15 thou plastic and fit inside the ends of the body with three lengths of rod or thick sprue to hold in position at the top. The cover I made from tissue paper (actually from a toilet roll) which was first screwed up to give a ruffled effect when flattened out. Cover the ends first, wrapping round the corners and then put one strip over the top and sides. The 'ropes' were made with cotton soaked in glue and stretched between pins stuck in a board in a zig-zag pattern. When dry, the pins can be removed and the stiffened cotton cut to length and stuck in place on the sides.

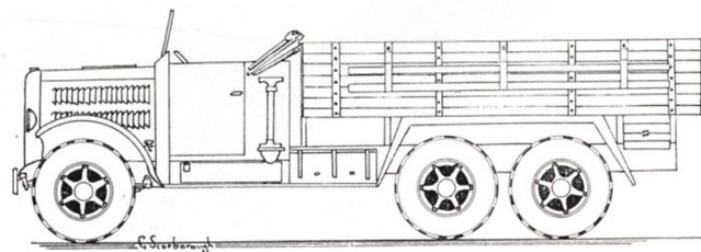
Stick the body in place square on the floor and after painting attach to the chassis assembly. Finish on my version was in Humbrol Africa Korps Sand with

added light earth 'dust' around the bottom sides, mudguards and track covers.

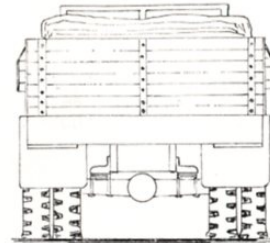
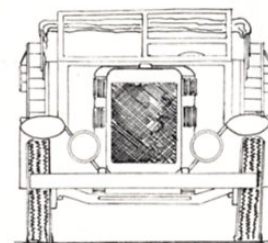
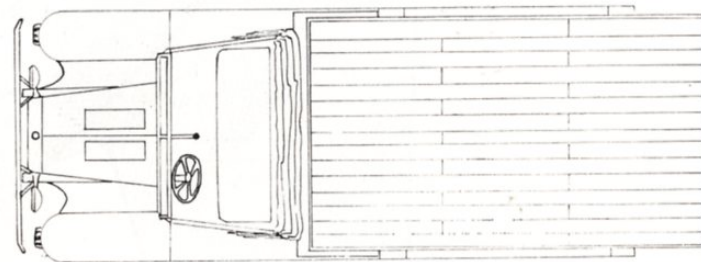
### Krupp L3H 163

THE Krupp L3H 163 was classified as a medium truck 6 x 4 and forms a simple scratch-built subject, using the wheels and axles of the Airfix Sd Kfz 7 kit.

Start construction by cutting out the chassis frames from 40 thou plastic sheet, making sure they are identical. Using the axles from the Flak 88 bogie assembly (parts 75 and 76), make up the chassis as shown in the 'exploded' drawing but not including the front axle at this stage. It is easiest to make this upside down and it should, of course, be true and square and will be a bit delicate at this stage. To mark out the various parts,



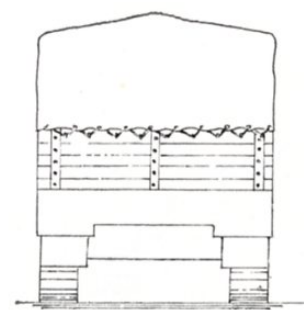
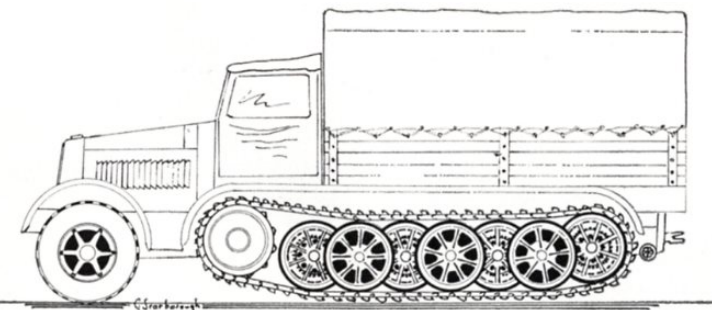
1:76 scale



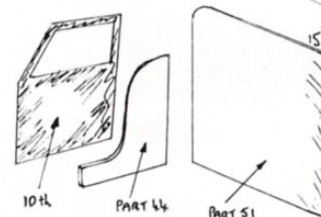
Krupp  
L3H 163  
Medium Truck

AIRFIX magazine

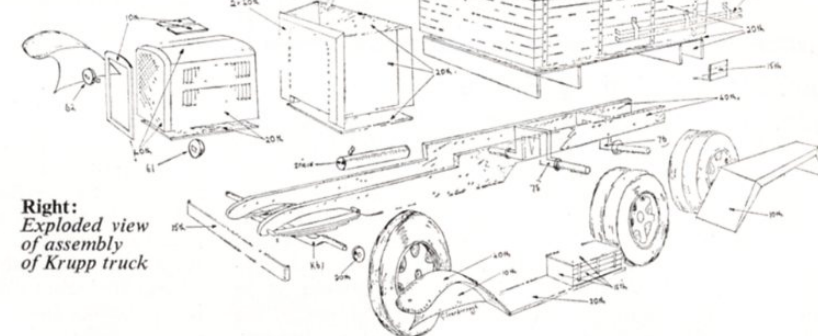
Sd Kfz 7  
Truck  
1:76 scale



Exploded view of body and basic cab assembly for the half-track truck. This is a simple but most effective conversion.

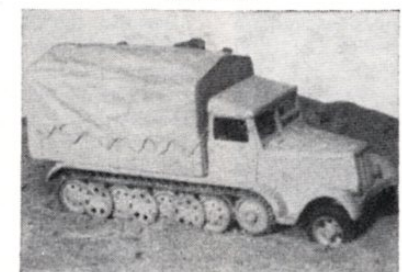


Assembly sketches are not to scale



Right:  
Exploded view of assembly of Krupp truck

Below: More views of the completed models. Beginners or those short of time are recommended to stick to the Sd Kfz 7 truck which utilises the Airfix half track chassis unaltered.



no time to find you have boomed.

The rear body is the last of the major components. Taking the dimensions from the plan, mark out the sides on to 20 thou sheet in one line about 17 cm long, score in the planking on both sides, and cut out to length. Assemble with the bottom again duly scored, holding together with Sellotape until dry. Cut the four bearers and attach in the correct position under the body, and add the tool boxes each side at the rear. Cement the whole unit squarely in place on the chassis/cab.

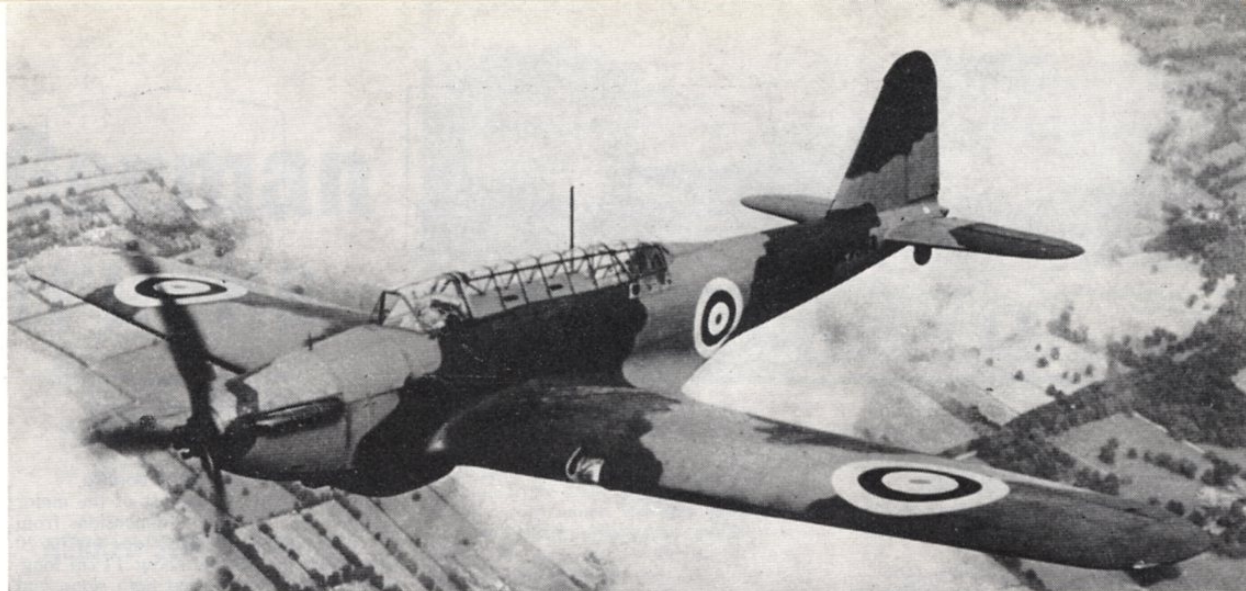
The rear mudguards (from 10 thou plastic) are cut out and bent to shape,

folding down the edges after well scoring. Attach under the body, noting that they do protrude slightly outside the body sides. The front mudguards are cut from 40 thou sheet, shaped to a rounded section and moulded round a hot metal bar or tube of the correct diameter as explained in my previous article on the GAZ lorries (July 1970 issue). An alternative is to laminate these from two thicknesses of 20 thou using a fair amount of cement between to soften, and Sellotaping round a dowel until well dry and then sanding to section. Stick these in place with the valance from 10 thou plastic, noting that they just catch the front cab bulkhead. Add the running boards with spares boxes from front to rear mudguards after first installing the cylindrical tanks from rod, knitting needle or sprue, under the cab floor.

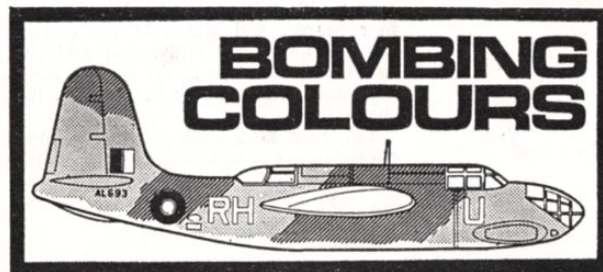
The front axle (mine came from the Austin K6, but a length of sprue would

Continued on page 41





Above: K7558 as new, wearing the A pattern scheme, very carefully applied. Below: K4303 in silver finish, the Battle prototype. After type trials it was used at Farnborough for drag research. It was grounded in May, 1939, as 1475M.

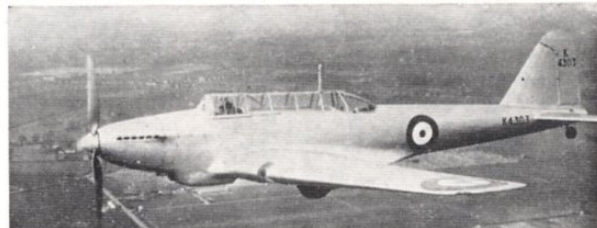


## Part 18: The Fairey Battle

SOME bombers had long worn camouflage of a sort, for such was the Nivo finish intended. But it was on the new expansion period aircraft that Camoutints (developed by Titanine Ltd) were introduced, to render the aircraft hard to see from above and difficult to locate from below. For all land-based aircraft, shades of brown and green—Dark Earth and Dark Green—were specified to be applied in a disruptive pattern. Air Ministry laid down basic patterns to be followed during planning, medium and light bombers of the period having patterning something like that of fighters, whereas larger bombers—particularly the Whitley—had more elaborate schemes. Undersurfaces were to be 'Night', ie, matt black, and peacetime roundels of the new Type A1 were clearly visible on account of the yellow outer ring. Black serials were to be applied on fuselage sides and on rudders; beneath the mainplane they were to be bold and white.

The only light bomber to emerge in this new scheme was the Fairey Battle. This design to specification P.27/32 was planned as the Hart replacement. Unfortunately, the terms of the requirement led to a rather mediocre machine when compared with other bombers coming along, but it was too late to improve it much. Replacement needs were urgent and as the Battle was the only light bomber available, production went forward with an order for 155, subsequently stepped up to 655 under production specification 23/35, in May, 1936. These aircraft were allocated the serials K7558-7712, K9176-9486, N2020-2066, N2082-2131, N2147-2190, N2211-2258. A new factory was built at Heaton Chapel to produce them.

All-silver, the prototype K4303 first flew on March 10,



1936. It proceeded to Martlesham for trials on October 31. Here a top speed of 257 mph was recorded. Wearing camouflage, the first production Battle flew early in 1937. It passed to Martlesham in July. Here it showed a disappointing top speed of only 241 mph.

Production Battles had A and B mirror image paint schemes like other aircraft, but photographs which have survived of early Battles show that mirror patterns were not necessarily applied to alternate aircraft, which was the normally accepted practice. Type A1 roundels with yellow outer rings were painted on the fuselage sides and above the wings, 70 inches outside diameter above the wings and 35 inches on the fuselage. Eight inch black fuselage and rudder serials were applied, but the digits were spaced further apart than usual, being two inches apart and making the serial total length about 33 inches instead of the usual 29. Under the wings the white serials were 42 inches high, and in 6 inch thick strokes.

Because the Battle did not meet requirements it was decided to cancel those which had not been delivered by March 31, 1939. It then became apparent that production of later types of bomber was lagging so Battle production was re-instated. Indeed, further orders of a stop-gap nature were placed with Fairey and also Austin Motors, who set up a new airframe shadow factory, and were under contract to build 500. Austin's order soon stood at 863 (L4935-5797).

Fairey production became quite rapid and to keep the production lines intact, also the labour force, another 400 were ordered, serials: P2155-2204, P2233-2278, P2300-2336, P2353-2369, P5228-5252, P5270-5294, P6480-6509, P6523-6572, P6596-6645, P6663-6692, P6718-6737, P6750-6769.

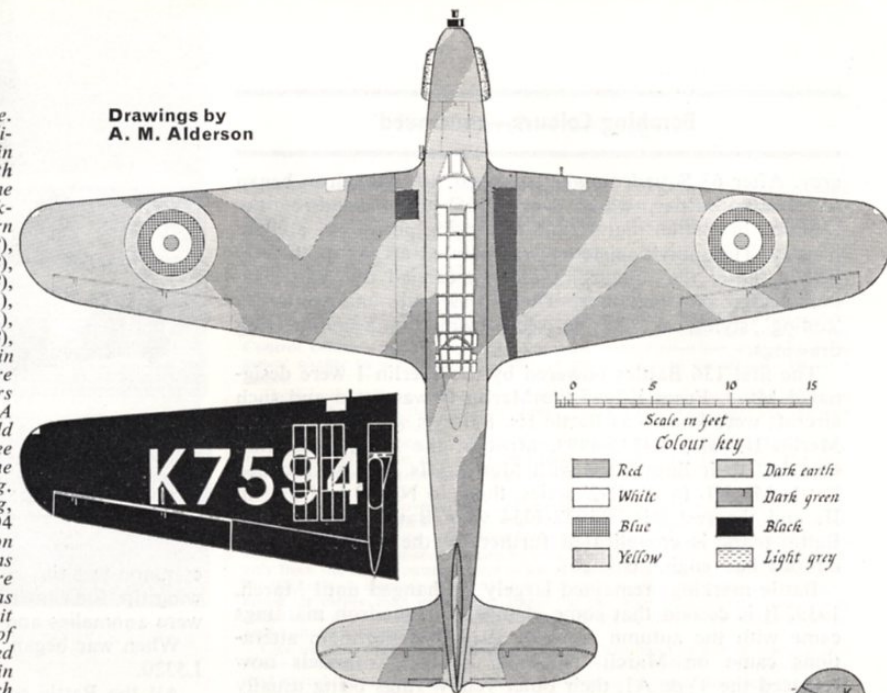
Delivery began with K7559 to 63 Squadron at Upwood on May 20, 1937. It became '63-A' ('63' forward on both sides). The number and letter combination was applied in light

Continued on page 30

AIRFIX magazine

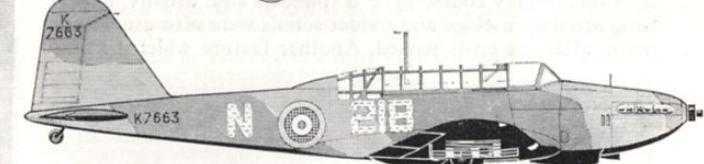
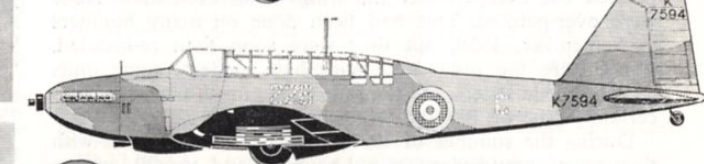
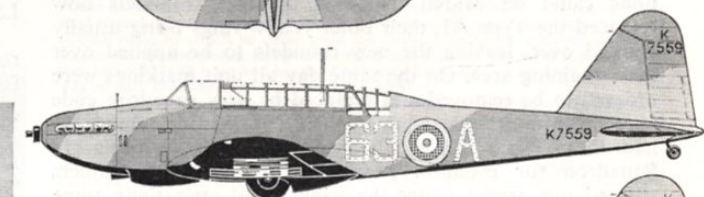
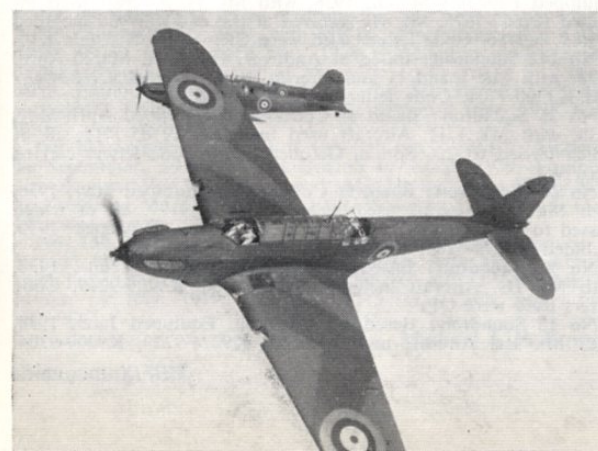
Right: K7594 wearing the B paint scheme. Although the instructions for camouflage application explicitly required alternate aircraft in alternate patterns this was not adhered to with the Battle—another example of how little one can depend upon the official orders where markings are concerned. Typical camouflage pattern applications were: K7558 (Pattern A), K7559 (B), K7576 (B), K7578 (A), K7594 (A), K7595 (B), K7596 (B), K7597 (B), K7602 (B), K7649 (B), K7650 (A), K7659 (B), K7660 (A), K7661 (A), K7662 (A), K7663 (B), K7666 (B), K9244 (A), K9261 (A), K9274 (B), K9282 (B), K9293 (B), K9324 (A), K9325 (B). L4935 the first Austin machine had Pattern A. A most unusual feature of some Battles was that they had the colours reversed in the scheme, thus K9322 had the A Pattern, but green where dark earth would normally have been. Lower right: The three Battles depicted here show how varied was the size and style of the 1938 squadron marking. K7559 in scheme A had bold unit numbering, 226 like 88 adopted small markings as on K7594 here and 218 Sqn went for thick numbering on K7663 wearing pattern B. Similar variations were to be seen where squadron codes were concerned. 142 Sqn had minute letters whereas 15 Sqn wore EF in large letters. Usually the unit letters were aft of the roundels on both sides of the aircraft—and the colour of the letters varied in tones of grey. Type B roundels also varied in diameter. It is totally wrong to imagine much conformity in these matters, despite the official orders.

Drawings by  
A. M. Alderson



Scale in feet  
0 5 10 15

Colour key  
Red Dark earth  
White Dark green  
Blue Black  
Yellow Light grey



Left, top to bottom: A formation of 142 Sqn Battles with K9335 nearest then K7704, K9292, K9293 and farthest away a machine coded KB, very small, and wearing Type B roundels (possibly K9295). Three Battles of 142 Sqn in May, 1938, before they had unit markings. K7674 and K7677 wear the B paint scheme whilst farthest away K7662 has pattern A ('Flight International' photo). The same three Battles again. K7674 peels away to show its upper surface colours ('Flight International'). Above: A formation of 105 Sqn. K7578:105-F is nearest and wears the battleaxe unit marking on the fin. It has a scheme camouflage. K7576 comes next in scheme B. Note the varying positions of '105' on the fuselage (Imperial War Museum).



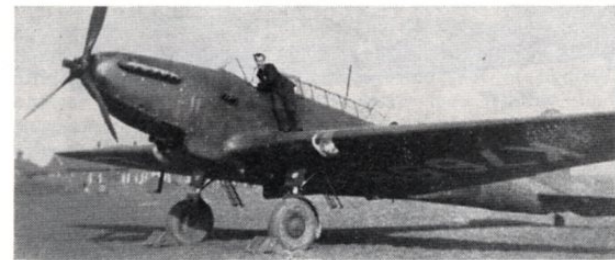
## Bombing Colours—continued

grey. After 63 Squadron was equipped, 105 Squadron began to receive Battles, which wore '105' well ahead of the roundels in smaller digits—and in varying positions—applied in grey. The individual letter was painted aft, as on 105-D: K7576. Later the squadron's aircraft carried the 'battleaxe' unit badge on their fins. There was little uniformity in 'coding' styles, as can be seen from the accompanying drawings.

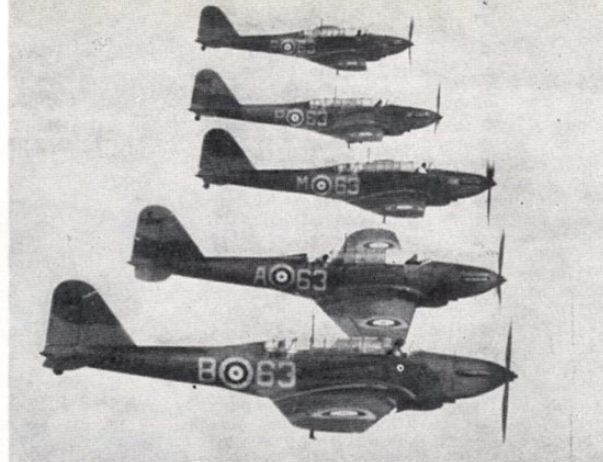
The first 136 Battles powered by the Merlin I were designated Mk I. From K7695 the Merlin II was fitted and such aircraft were known as Battle IIs. Fairey's second batch had Merlin IIs, also L4935-4993. Most of the Austin machines then left their lines fitted with Merlin IIIs, and were called Battle Mk III. In the 'N2' series, those to N2109 had Merlin IIs and the rest IIIs. R3922-4054 were Battle IIIs. But the Battle mark is complicated further by the fact that many aircraft had engine changes.

Battle markings remained largely unchanged until March, 1939. It is certain that some changes to squadron markings came with the autumn crisis of 1938, but the main alterations came on March 24, 1939. B Type roundels now replaced the Type A1, their outer yellow rings being usually painted over, leaving the new roundels to be applied over the remaining area. On the same day all unit markings were ordered to be removed and replaced by grey squadron code letters. An interesting anomaly here is that some squadrons had these much earlier alongside Type A1 roundels, 15 Squadron for instance. Many had their serial numbers painted out except under the wings—and even there some were over-painted. This had been done on many bombers in September, 1938, but they were soon then re-instated. There were the usual anomalies here evident, some units carrying code letters and the unit badge on the fin. This was certainly true of 103 and 142 Squadrons.

During the summer of 1939, markings came in line with the orders—grey codes, Type B roundels and, usually, under-wing serials. Fuselage and rudder serials were also usual once more, after the crisis passed. Another feature which became



Top: K7659 of 218 Squadron, showing the large under-wing serials. (Ron Clarke photo). Above: K9274 a Battle II initially delivered to 150 Squadron.



Above: A formation of Battles of 63 Sqn. K7649:B nearest, then K7559:A. P is K7645. Aircraft A is drawn on the previous page to show its appearance from the port side.

common was the carrying of a Type A roundel beneath each wing tip, for which instructions were issued. But again, there were anomalies and this roundel was not always applied.

When war began, deliveries had reached about P2310 and L5320.

All the Battle squadrons were home based. Their squadrons and equipment, in order of being equipped, were as follows:

**No 63 Squadron:** Based at Upwood and equipped between May and August, 1937, with Mk Is. Aircraft used included K7559-7570. K7649 became 63-B. Replaced by Battle IIs in December, 1938, eg. K9412-9423 incl. Code letters used were NE.

**No 105 Squadron:** Based at Harwell and equipped between August and October, 1937, with Mk Is. Aircraft used included K7571-7576, K7578-7585. K7576 became 105-D. Mk IIs arrived October, 1938, eg. K9338-9342. Mk IIIs in use August, 1939, included P2258-2261. Code letters used were MT.

**No 226 Squadron:** Based at Harwell and equipped October-November, 1937, with Mk Is. Aircraft used included K7588-7590, K7592-7598. K7596 became 226-C. Mk IIs arrived October, 1938, eg. K9343-9347. Mk IIIs in use August, 1939, included P2250-2257. Code letters used were KP.

**No 52 Squadron:** Based at Upwood and equipped November, 1937, to January, 1938, with Mk Is. Aircraft used included K7602-7612. K7602 became 52-B. Mk IIs arrived in November, 1938, eg. K9395-9401. Mk IIIs arrived August, 1939, eg. P2267-2269. Code letters used were MB.

**No 88 Squadron:** Based at Boscombe Down and equipped December, 1937-January, 1938, with Mk Is. Aircraft used included K7629-7644. They carried '88' ahead of the roundel and later adopted the code letters HY. Mk IIs arrived October, 1938, eg. K9348-9352. Mk IIIs came in July, 1939.

**No 218 Squadron:** Based at Upper Heyford but moved to Boscombe Down April, 1938. Equipped January-February, 1938, with Mk Is. Aircraft used included K7651-7661. K7655 became 218-F. Code letters used were SV. Mk IIs arrived October, 1938, eg. K9353-9357. Mk IIIs came in July, 1939.

**No 12 Squadron:** Based at Andover, to Bicester May, 1939. Equipped February-March, 1938, with Mk Is. Aircraft used included K7667-7675. Mk IIs received at the end of 1938 included K9485, K9486. Code letters used were QE.

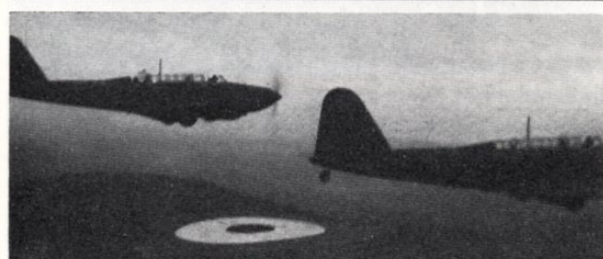
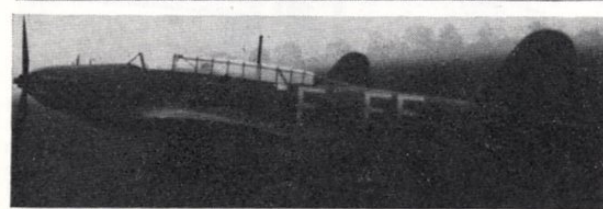
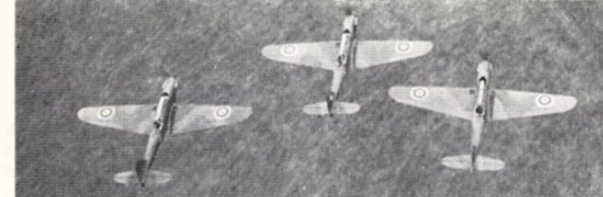
**No 142 Squadron:** Based at Andover. Equipped March-April, 1938, with Mk I and II and aircraft used included K7683-7689 and K7700-7704. Code letters used were KB.

**No 35 Squadron:** Based at Cottesmore. Equipped April-May, 1938, with Mk I/II. Aircraft used included K7705-7712, all of which passed to 226 Sqn in October, 1938. Code letters carried were WT.

**No 207 Squadron:** Based at Cottesmore. Equipped May, 1938, with Mk IIs. Aircraft used included K9185-9197, all of which passed to 105 Sqn in October, 1938. Mk IIIs used August, 1939, included K5274-5284. Code letters carried were WJ.

**No 98 Squadron:** Based at Hucknall. Equipped June, 1938, with Mk IIs. Aircraft included K9201-9206, K9209-9219. Code letters used were QF.

**No 15 Squadron:** Based at Abingdon. Equipped June, 1938, with Mk IIs. Aircraft used included K9224-9229, K9300-9304.



Top to bottom: Three Battles of 142 Squadron, showing the two paint patterns. The leader appears to have the squadron badge on the fin on a white disc 'Flight International'. K7602 of 52 Squadron wearing grey unit markings and in paint scheme B. (MoD photo). What must be a unique photograph. A 15 Sqn Battle EF-F photographed by R. Hunter and contributed to our pages by Bob Kirby. It has Type B fuselage roundels of very small diameter and the fin serial difficult to read, may be K9228. Just evident on the upper mainplane (in the original print) is a Type A1 roundel. The photograph was taken at Abingdon late 1938—same months before codes became mandatory. Battles of 15 Sqn photographed at the start of 1939 on their way to the armament practice camp at West Freugh. The Type A1 roundel can be seen on the aircraft in the foreground, EF-G and EF-F have Type B roundels on the fuselage about two feet in diameter. Photo is also from Bob Kirby, and taken by R. Hunter who served with the squadron. Though of poor quality these last two pictures are of great historical interest.

Mk IIIs used from July, 1939, including L5227-5239. Code letters used were EF.

**No 40 Squadron:** Based at Abingdon. Equipped July, 1938, with Mk IIs. Aircraft used included K9234-9239, K9306-9310. Mk IIIs in use by July, 1939, included L5240-5250. Code letters used were OX.

**No 106 Squadron:** Based at Abingdon, to Thornaby September, 1938. Equipped July, 1938, with Mk IIs. Aircraft included K9247-9250, K9262. Re-equipped May, 1939. Code letters used were XS.

**No 185 Squadron:** Based at Abingdon, to Thornaby September, 1938. Equipped July-August, 1938, with Mk IIs. Aircraft used included K9251-9256, K9259-9260. Re-equipped June, 1939. Code letters used were ZM.

**No 103 Squadron:** Based at Usworth but moved to Abingdon in September, 1938, and to Benson in April, 1939. Equipped July-August, 1938. Equipped with Mk IIs including K9263-9271 and received Mk IIIs by July, 1939, including L5204-5214. Code letters used were GV.

**No 150 Squadron:** Based at Boscombe Down, moved to Benson April, 1939. Equipped August, 1938, with Mk II. Aircraft used included K9274-9277, K9279, K9280, K9282-9288. Mk III in use by July, 1939, included L5215-5225. Code letters used were DG.

Michael J. F. Bowyer

## Fire Control—from page 21

was laced over it when the director was not in use. Some Mk III directors had a power operated stabilisation drive from an oil motor which automatically compensated for ship-roll, and when this was fitted, it was contained in a casing suspended below the director floor.

**Mk IV and Mk IV HA/LA:** By the time this mark emerged, many improvements had been incorporated into the system as a whole, and the director design was modified accordingly. Initially, hydraulic power training was fitted, with a alternative hand drive as before, while elevation remained a hand-control supplemented by a power stabilisation drive. Later, elevation was also given power-follow arrangements, and at the same time, a 'scooter' unit was added in the Control Officer's position by which he could control elevation and training in power aiming by a special open-sight, or merely slewing the director on to a target.

These improvements necessitated considerable structural alterations, which in general made the director rather cramped. Again, Radar was added and the rear of the director plated in.

In some applications the Mk IV was used in a Dual Purpose role for anti-aircraft or surface fire, and was then known as an 'HA/LA Director'. The after centre-line director in the later classes of 6 inch and 5.25 inch cruisers were of this type.

**Mk V HA/LA:** To overcome the cramped and rather uncomfortable conditions experienced in the Mk IV director, a completely new unit was designed, which became available for the battleships *Duke of York*, *Anson*, and *Howe*, and for the aircraft carrier *Indomitable*. As can be seen from the sketches it differed considerably from the earlier patterns, was much roomier, and afforded better protection for the crew. A number of technical improvements were incorporated, including binocular rather than monocular sights for the layer and trainer, and it was designed to carry Radar rather than having the aerial 'tacked-on' as had been the case with the previous marks.

Like its immediate predecessor, the director had hand or power training and power-stabilised hand elevation controls. No 'scooter' control was provided for the Control Officer, but he did have an independent training handwheel for power control only, by which he could train the director on to the selected target. An additional hand-training handwheel was fitted close to the layer's position, so that he could both train and lay the director sights himself in an emergency, for it was he who fired the guns from his Master trigger.

The director invariably controlled Dual Purpose weapons and only existed in the HA/LA style. It controlled them in HA fire through the HACS calculator, and in surface fire through an alternative surface Fire Control 'Clock'.

**Mk V(M) HA/LA:** Towards the end of World War 2 it was decided to cease production on the HACS for future ships, and to fit a modified 'small ship' installation in place of the original calculator, as an interim measure until the electronic computers under development were perfected.

The last two aircraft carriers of the *Illustrious* class—*Implacable* and *Indefatigable*—were so affected, and as a result of war experience, the Mk V HA/LA director was re-designed to include further technical improvements. The new tower, known as the Mk V(M), was almost totally enclosed and although externally similar to the Mk V, its control arrangements were entirely different. Full power control through electric driving motors was provided, and the tower could be operated in Remote Power Control by Radar operators in the Calculating Position below. It was only fitted in the two ships mentioned and went out of service when they were scrapped in the mid 1950s.

**Mk VI HA/LA:** A completely new configuration emerged with the arrival of this director which was the natural successor to the interim Mk V(M), but although it later became a quite widely fitted equipment, it saw almost no war service.

It introduced the twin-masted gunnery Radar and closely followed the comprehensive power arrangements of its forebear.

When first conceived it was intended to adapt it as a retrospective fitting to ships with HACS, but in the event only the battleship *Anson* had her Mk V directors replaced by Mk VI.

The last of the triple 6 inch cruisers—*Superb* and *Ontario*—employed it in the combined 'sided-ended' arrangement, but in both ships the directors were linked to the interim 'small ships' fire control and only the very earliest destroyers of the 'Battle' class carried the director to war in the closing months of the Pacific campaign, in 1945.

## SURFACE CONTROL FROM THE HACS

In modernised and new construction capital ships, the secondary armament was designed around Dual Purpose guns, which could be used in a surface action if the occasion demanded. Thus, a capital ship could engage heavy enemy units with her main armament, and beat off enemy destroyer attacks with her secondary calibre guns.

The DP weapons were directed by the HACS Directors as in Anti-aircraft fire, but via a separate surface predictor rather than by the HACS Table.

In the 5.25 inch cruisers the guns were in any case normally directed by a DCT in Surface Fire, but could be 'divided' into forward and after groups, when the after group was controlled by the after HACS director via its HACS Table in a special surface mode. Should the DCT be 'knocked out' the forward HACS director could similarly control the forward group through its own HACS Table. Otherwise, the HACS directors were employed only in AA fire control in either one or two groups.

The twin 4 inch batteries in the 6 inch cruisers were principally for AA defence, but again could be used in surface if required, controlled through the HACS as in the 5.25 inch ships.

The subject of fire control will be concluded in the next instalment which will cover small ships' installations together with close range directors and miscellaneous equipment.



# STALIN TANK

by

JOHN MILSOM

## Part 2: The KV series

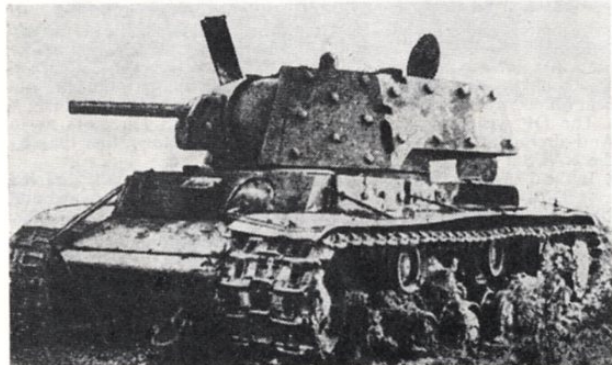
TOGETHER with the KV-11, the KV-1 was successfully used during the breakthrough of the Mannerheim Line. As was expected, the 75 mm armour reliably protected the tank from 37 mm anti-tank rounds. During 1940 a total of 243 KVs were built, and a further 393 were completed during the first half of 1941. Both the KV-1 and KV-11 were considered as powerful breakthrough tanks. In 1941 the situation necessitated a bias towards the KV-1, and shortly after the beginning of the war production of the KV-11 stopped.

The KV-1 was originally employed for the assault of fortified positions, and proved quite effective against the Germans during the early campaigns—although there were insufficient numbers to cause any great effects. The original KV-1 had an angular turret of rolled plate with a pronounced rear overhang; this turret was suited to production in older type plants, and was eventually produced simultaneously with cast turrets.

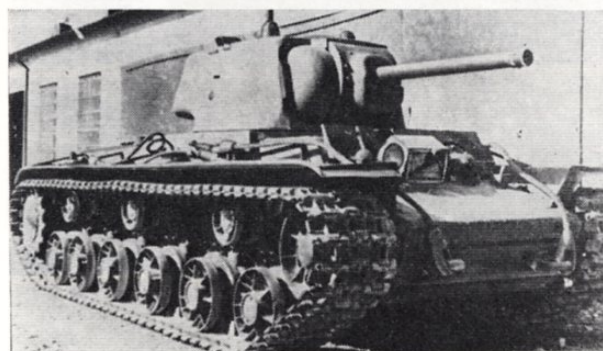
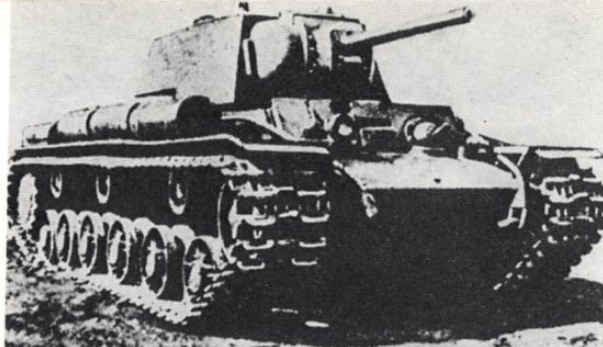
In addition to the 76.2 mm gun, the KV mounted three machine-guns; one to the right of the main armament, one in the right front of the hull, and one in the turret rear. The turret had two episcopes at the rear, one on each side, one for the driver, two gunners' periscopes, and a vision slit with a pistol port on both sides and in the rear of the turret. The general interior arrangement of the hull was practically identical to the T-34 in order to reduce problems in maintenance and re-supply. The creation of the KV-1 determined the future development of the heavy tank by virtue of its unique combination of powerful armament and heavy armour.

During 1940 an improved model of the KV-1 appeared, designated KV-1A (German Intelligence designation; the Russians adopted no standardisation of their own), and was provided with a higher-velocity gun (76.2 mm L/41.5 Model 40), firing a longer round. The tank also had new bogie wheels. The KV-1A was initially intended as a commander's tank, but later, other KV models received this more-powerful gun as it became available.

The significant effect of German anti-tank guns at close ranges during the early campaigns of 1941, forced the Russians to up-armour the KV tank. Extra 25-35 mm plates were welded to the glacis plate and the driver's plate, and plates 35 mm thick were



Above: A KV-1 (note the original short 76.2 mm gun) uparmoured with bolted plates on turret and hull sides. In this form it was brought up virtually to later standards and was known as the KV-1B (bolted turret).



Top: A KV-1A in its uparmoured form with extra plating welded over the hull front plate and extra plates on the turret front. Note the extra external fuel tanks. Above: The KV-1B (cast turret) showing extra armour welded on hull nose.

bolted to parts of the side superstructure armour and the sides of the turret. The frontal armour was likewise increased. This up-armoured version was designated KV-1B (bolted turret). Production of the KV-1B was undertaken just before the outbreak of the war with Germany, and resulted from a demand by Stalin to increase the armour on the KV; Stalin had asked for double the thickness without a decrease in combat efficiency. The experts opposed this suggestion but were, as usual, over-ruled. The manner in which the extra armour was attached suggested that the original armour structure was weakened rather than improved. Before the Germans even attacked, the Russians had been dissatisfied with the angularity and weakness of the crude KV-1A turret, and consequently KVs with cast turrets were integrated with KV-1As during early 1942. These tanks were designated KV-1B (cast turret). As with the T-34 Model D, the over-hang on this turret was eliminated to deter shells and explosives from wrenching off the turret.

With the apparent success of the cast turret on the KV-1B (cast turret), a further model of the KV was produced in early 1942 with the turret armour increased to 120 mm; this model was designated KV-1C. The KV-1C employed the same 76.2 mm L/41.5 Model 40 tank gun as the KV-1A. The armour casting of the turret not only had improved ballistic properties, but also strengthened the turret base. The frontal armour on the KV-1C was similar to that of the KV-1B, although the armour on the hull sides was increased to 90 mm with an extra thickness of 40 mm added on parts, giving a total of 130 mm. The KV-1C was, all round, a more efficient tank than the KV-1B.

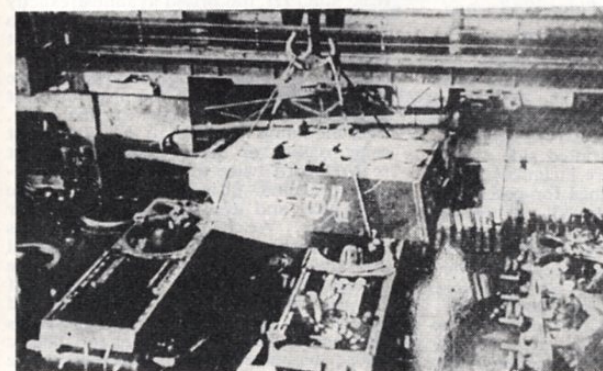
Although the weight had increased to 47 tons, its new 28 inch wide tracks gave it a good ground-pressure of 10.4 lb psi. The V-2 engine was up-rated to 600 hp and gave the vehicle a speed of 18 mph.

As the result of combat action it was considered necessary to increase the overall mobility of the heavy tank and also remove several design faults. Modernisation of the KV-1 heavy tank was carried out during the second half (Summer) 1942. Stalin instructed Kotin to design a revised version, which became known (by the Russians) as the KV-1s (where 's' meant *skorostnoy*—fast). It was appreciated in the specification of the KV-1s that since it was impossible to provide it with full immunity—whatever was sacrificed, it would be better to smooth out the radical

difference in performance and mobility from the T-34. In order to increase the speed, the tank's weight was reduced to 42.5 tons by employing less armour thickness (the armour on this tank was reduced from 75 to 60 mm) and by reducing the overall dimensions of the hull. It was further modified with a newly designed gearbox and main clutch, together with improvements in the engine cooling and lubrication systems; these innovations enabled the tank to achieve a higher speed of 25 mph. To improve observation, a commander's cupola was introduced. Only a few models of this tank were produced during the period August, 1942-June, 1943.

During the Summer of 1943, the KV-1 was fitted with a new cast turret having improved ballistic shape and mounting a more powerful 85 mm gun.

The modified hull of the KV-1s mounted a new turret with stronger armour. Due to technological improvements the crew of this vehicle (and all subsequent Soviet heavy tanks) was reduced to four men (commander, gunner, driver and loader). The KV-85, as it later became known, was basically a re-armed and re-turreted KV tank, designed to take the M-1943 tank version of the M-1939 85 mm anti-aircraft gun. The turret was provided with a commander's cupola, bringing the overall height of the tank to over nine feet. The turret had a curved mantlet with a circular hole for the gun. The armour on the hull was slightly reduced to counter-balance the increased turret weight (60-65 mm), and the tank was mass-produced during the Autumn of 1943. This new turret was later used for the T-34/85 medium tank—although in this case the rear machine-gun mounting was removed. KV-1Cs



Above: A view of the original KV-1 turret with short 76.2 mm gun and machine gun in rear. Note the episcopes and twin horn periscopes.

## New for Gnats—from page 22

scheme was superseded in March, 1970, by that now being applied to Gnats, and depicted in Alf Alderson's accompanying drawings, based upon material very kindly supplied for publication by Flt Lieut E. Drinkwater of CFS and Hawker Siddeley Aviation Ltd.

There are a number of points raised by the new scheme. First, of course, is the re-employment of 'T-bands', a 1947 feature dispensed with when dayglo took its full stride. This time they have taken on a new racey look. It will be seen that the wing roundel is only of 18 inches diameter, and back in its 'proper' position, albeit very close to the tip. The old maxim that roundels should be sited about 1/6 of the span from the tip is quite overlooked these days. The white band, visible from at least three miles on a clear day, is quite an outstanding feature, and it will be seen to taper. One ceases to be surprised at the measurements of markings, but even so who would have thought that the fin flash would measure 17 inches high and 11 inches wide—which means that each stripe would ideally be 3.66 (recurring) inches wide! The flash is, incidentally, outlined by a thin black line. It will be interesting to see if swept fin stripes catch on—the Lightnings of Wattisham's TFS now wear them.

One feature is that the new scheme is applied over a previous hard, long-lasting polyurethane finish. Before the new paint can be applied much preparation has to take place. Instructions are



Above: KV-1B tanks in production at the Leningrad Tank Plant, Winter 1941-42. They were painted white on the assembly line. Added armour is clearly visible.

were also retro-fitted with the new turret, and both models of the new KV-85 entered service in time to encounter the German Tiger I tank. After only limited production, the KV-85 tank was taken out of service in the Winter of 1943.

As previously mentioned, an artillery tank version of the KV was produced. The KV-11A (German designation) appeared during January/February, 1940, and mounted a 152 mm M-1938/40 L/20 howitzer in a high, box turret with all-round traverse. It utilised the hull of the KV-1. This vehicle was found to be operationally ineffective due to the inability to traverse the turret when on an incline, and its unsuitability for providing anti-tank fire or firing on the move. It was usually fired from stationary and concealed positions. Even so, development of this model continued.

During 1940, Kotin produced a second model, the KV-11B, which had a new turret and wider tracks, being based on the newer KV-1B chassis. This model was taken into service, but was little improvement (if any) over the first version. The most significant external difference was the asymmetric mantlet.

During 1943, Kotin produced two experimental KV-11 variations: the KV-11-1 with the 85 mm anti-tank gun of the KV-85, and the KV-11-2 with the new 122 mm anti-tank gun. Even these models of the KV-11 failed to meet the requirements of tank, assault gun or self-propelled artillery; no further development of the KV-11 is known to have taken place.

A flame-throwing version of the KV-1C was produced, designated the KV-8. This was almost identical to the KV-1C but had a 45 mm gun and flame-gun in the turret in place of the normal armament.



# NEW

## KITS AND MODELS

### NEW TRANSFERS

DE FREY DECALS LTD, 248 High Road, Leyton, London E10, have released two identical sets of transfers, in 1:72 and 1:48 scales respectively, giving markings for four different P-39 Airacobras of various marks. Two USAAF, one Free French, and a Russian machine are covered, the sheet containing all necessary codes, serials, and non-standard markings, but not the French or US 'stars and bars' which can be taken from other transfer sheets or kit transfers. Well printed and with full colour scheme drawings included, the 1:72 sheet costs 5s 2d, and the 1:48 version 6s. They can be had by mail (postage extra) from BMW Models or Modeltoys, or direct from De Frey.

Latest transfer sheets by the Letraset process from Dri-dec, 19 Market Street, Newbury, Berks, are for German tank markings in 1:76, 1:48, and 1:35 scales. Sheet A1 features SS-Panzer divisional markings for all three scales, sheet A2 includes tactical markings, tank division markings, and yellow callsign numbers, all for 1:35 scale. Sheet A3 is virtually the same thing for 1:48 and 1:35 scales, but with the addition of tactical callsigns in various styles. Sheet A4 features the same thing in 1:76 scale with a selection of crosses and number plates for 1:35 scale. For most modellers we fancy the latter as the most useful set to start with. The numberplates are particularly well printed. None of these sheets features anything that hasn't been done before by Micro Decal or Almarks, but the very crisp printing and the advantage of the pressure contact facility will commend these sheets to many military modellers. Price per sheet is 7s, postage extra.

Almarks themselves have also released military transfers for German vehicles suitable for 1:48, 1:35, or even 1:25 scale. Sheet LT1 from this firm includes air recognition national flags, chassis numbers (very tiny) in white and black, plus a selection of tactical and divisional markings suitable for kits available in larger scales. Sheet LT2 includes 'kill' bands for gun barrels various panzer and SS-Panzer divisional emblems, assorted national crosses—including plain white—and other small markings. Each sheet costs 5s 9d from Almarks' stockists. Latest Almarks aircraft transfer sheet to reach us covers the Allied side in the Western Desert campaign, and provides colourful markings for a 274 Sqn Hurricane IIC, a Kittyhawk of 2 Sqn SAAF ('The Flying Cheetahs'), and a Warhawk of No 65 FS, USAAF. As usual, colour scheme drawings are included and the sheet is well printed and nicely registered. Price is 5s 9d.

Jones Bros of Chiswick have sent us further samples released in the Riko transfer series and produced in Italy. Of these, the aircraft sample covered the B-17 and appears to confirm the policy



Recent release in the Rareplanes series is this model of the Vultee Vindicator to 1:72 scale. Though intended for the advanced modeller, this particular one is easier than most previous Rareplanes models and can utilise some Dauntless parts. Price is 10s 6d, plus 1s postage from Rareplanes, 18 Hillford Place, Earlswood, Surrey.

of reproducing markings and colour art taken more or less direct from the Profiles series of publications. The B-17 sheet features individual markings, codes, and serials, for four assorted B-17Fs and 'Gs, complete with colour printed side views. No national markings are included. Some assorted personal markings for other aircraft (but not serials, etc) fill the rest of the sheet. The military sheet is extremely well printed and features British tanks, again simply reproducing markings given in previous AFV Profiles, plus a few which have not been in the Profiles. This leads to some anomalies, for some errors perpetuated in the Profiles artwork are repeated and markings are included for a Tetrarch, Crusader, and Cromwell, none of which are available as 1:35 scale kits as yet! The Churchill markings included, on the other hand, are much too big for the 1:48 scale Aurora model on which they could logically be used. As a source for assorted British military markings, however, this sheet offers quite a lot for the modeller of large scale tanks. The Riko sheets cost 9s 11d each, postage extra. C.O.E.

### TWO CHOPPERS

ROCO, the Minitanks people, have ventured into aircraft kits with the release of two American helicopter models, the UH-1D Iroquois and the AH-1G Hueycobra, both of Vietnam fame. These two kits are beautifully moulded and finely detailed, which will come as no surprise to anyone familiar with the standard of the Minitank military models. They are in the same crisp, flash-free plastic and the parts almost literally fall into place—though these are not snap-together items like the Roco tanks.

Obviously the kits are part of the overall Minitanks range (and are, in fact, numbered in the same series) for they are to 1:87 scale matching the scale of the tanks. This makes them on the small side for inclusion in 1:72 scale collections but

no doubt many helicopter fans will overlook the matter of size.

The only criticism that can otherwise be made is of the indifferent transfers supplied; the same sheet is provided with each kit so the serial for one or the other (or both) must be bogus, and the registration is poor. The Iroquois box-art shows an alternative finish for the Casevac role, but no matching transfers are included. Transfers apart, both kits are highly commended, especially at the modest price of 5s 11d each. Jones Bros of Chiswick supplied our samples and hold stocks, available on mail order, postage extra. C.O.E.

### ASSAULT GUN

LATEST military kit to reach us comes from Otaki of Japan and is a 1:35 scale StuG III, motorised in almost exactly the same simple way as recent Nichimo 1:35 scale tank kits. This model does not reach Nichimo standards, however, but shilling for shilling it is good value since it is only just over half the price of most Nichimo or Tamiya kits to this scale. The moulding appears to be an almost exact replica of the Airfix StuG III kit scaled up to twice the size for its superstructure and fittings assemble in the same way and even the callsign number is similar! We had not completed this model at the time of writing, but initial assembly proved to be very simple, the chassis being similar in style to that of the Nichimo Pz IV so that the road wheels are just popped on to the axles and held in place by separate soft plastic hubs; the axles are ready moulded to the chassis.

The kit moulding falls over in the shape of the 'Saukopf' cast mantlet which is very badly done and needs some filing—use the Airfix kit as a guide—to correct. Similarly, the twin road wheels are moulded as single items which makes for simplicity but detracts slightly from overall appearance. Lastly, the rubber track looks very flimsy and will obviously need treating with rubber lubricant to prolong its running life. These points apart, the kit is well worth the 19s 6d asking price for a model of this size and type. The box-art, incidentally, shows a completely different early variant of the StuG III, not the model provided! Jones Bros of Chiswick provided our sample and can supply by post, postage extra. C.O.E.

### NEW CAR MODELS

RECENT die-cast models we've received include, from Lesney, a very fine Massey-Ferguson tractor and trailer to 1:45 scale and priced at 10s 6d. To 1:86 scale (HO size) is a neat little model of a Merryweather Marquis fire engine on an AEC chassis, just right for model railway or airfield scenes. There is a splendid DAF car transporter at 1:66 scale which costs 12s 6d, unfortunately

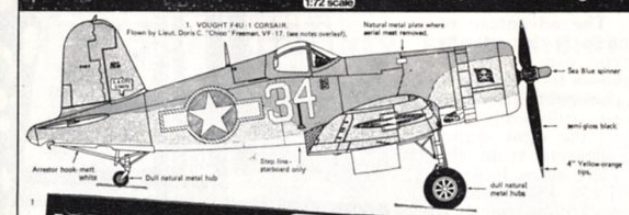
Continued on page 36

AIRFIX magazine

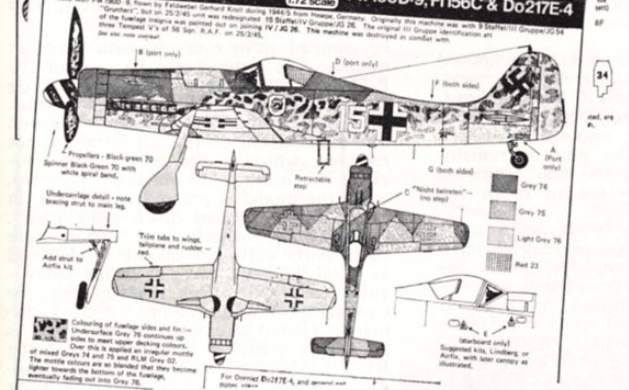
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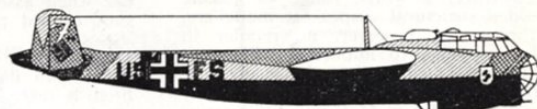
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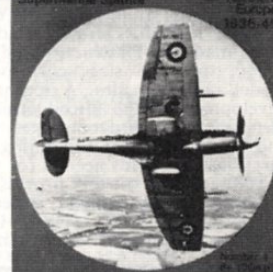
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## New Kits—continued

too big for model railway scenes but a good looking model nonetheless. To 1:62 scale is a marvellously detailed Dodge Charger Mk III with opening cockpit and full internal detail, good value at 2s 8d. And finally, at 1:76 scale and the same price, is an Eccles caravan with full interior detail. An accessory useful for railway, roadway, or military scenes is a new Service Ramp in the Matchbox range, complete with working lift and service console with instruments, oil pumps, and retractable greasing hoses. To OO/HO size, it is just the job for 'maintenance' scenes and costs 4s 6d.

Two newcomers from Corgi are in the 1:43 scale category favoured by car collectors, and these are Chevy Sting Ray with removable wheels and detachable 'hardtop' panels, plus retracting headlights, and a special-bodied version of the Citroen DS used as a Tour de France cycling team car. This has a pickup type back with handrails, rack for spare cycle wheels, a driver figure, and a 'trainer' with megaphone. Prices are 10s 6d and 9s 6d respectively. C.O.E.

## PLASTRUCT

AN important American product of which we've had samples and details is Plastruct, a whole range of plastic moulded structural shapes for modellers. Unfortunately, however, no retailer in Britain appears to import the Plastruct range so its mention here is largely academic to the British modeller. The Plastruct people, in fact, put out a series of materials on the same lines as those made in Britain by Slater. However, the range is vastly more complex. Just mentioning a few items at random, Plastruct have available H girders, I girders, channel plating, angle iron, T girders, strip (like Microstrip), rectangular tubing, round tubing, and many more. Also available is an assortment of plastic card sheet in many thicknesses. Saddles, man-hole covers, pumps, valve wheels, and other useful bits and pieces can also be had, and there is an impressive range of sizes for everything. In fact, every conceivable item for scratch-builders seems to be made by Plastruct, mainly in 1:48, 1:160, or 1:86 sizes corresponding to model railway scales. A recent Plastruct development is the introduction of complete kits for girder bridges, oil wells, and so on, each kit containing all necessary Plastruct items needed for the model.

The address of the firm is Plastruct Inc, 1621 North Indiana Street, Dept P, Los Angeles, Calif, 90063, USA. The Plastruct catalogue and handbook is

available from this address for 50 cents in US currency, not sterling. C.O.E.

## CAR KIT

A MONGST recent car kits received is the 1912 Ford Model T from the Japanese firm of Midori. This particular kit makes the two-seater runabout version.

The kit, to 1:16 scale, is very complete in pre-coloured plastic, although the dark green body would look smarter in a brighter colour. The advantage of these larger scale models is that all the detail of the prototype can be reproduced, like separate glasses for the lamps, etc. The texture of the upholstery and hood is captured most realistically and the 'brass work' is just the right shade. The radiator, being separate from the surround, gives that nice, clean look of the original. This particular kit is motorised and, in what seems to be standard practice in Japanese kits, the 'works' are contained in replicas of the engine and back axle. A moulded ratchet on the track rod retains the steering in the selected position.

The batteries (not included) are housed neatly in the box under the rear seat. Small bulbs are supplied for the headlights and lights, and motive power is controlled by a very unobtrusive switch in the rear section. One point to remember when assembling the rear lamps—a spot of red paint is needed inside the lenses.

The instructions in 36 stages are quite clear, with illustrations and abbreviated English text. The completed model has all the character of the original and will grace anyone's sideboard or hall. At 79s 11d it is very good value and Messrs Jones Bros of Chiswick, who supplied this kit, have a range of other car kits from Midori. B.L.

## FROM FROG

THREE excellent new kits have recently been released by Frog, all to 1:72 scale. Biggest is a first-rate model of the Whitley, which in typical current Frog style offers a choice of markings and a choice of marks—either for Cheshire's Mk V bomber or a Coastal Command Mk VII with ASV radar. Finish of the mouldings could not be bettered, and everything fits together perfectly. The only minor criticism is the omission of the under-wing airdrops for the Coastal Command version (easily added by the modeller, however) and a wrong description (but correct illustration) for the Coastal Command colour scheme. At 17s 6d, this kit remedies the one omission in the existing Airfix range of RAF heavy bomber kits of 1939-45 and should



Items from the Plastruct range, including valves, pumps, ladders, girders, and the catalogue.

be snapped up by everyone with the other models. The same might be said of the P-51A Mustang, also released by Frog and a fine companion to the late-mark Mustangs produced by other kit makers. The panel detail on this kit is raised, not recessed, which is the only minor criticism. This is much less obtrusive, however, when the model is painted and it can, in any case, be rubbed down quite easily. Characteristic wheels and canopy are particularly well done on this model, and as usual there are two sets of markings—either for a No 2 Sqn RAF machine or Colonel Cochrane's famous 1st Air Commando Group aircraft, USAAF. Price is 3s. Lastly comes a beautiful kit of the RF-101 Voodoo, obviously from Hasegawa moulds but released under the Frog label. This is an immense model, for a single-seater, and an interesting contrast in size with the Mustang. As is usual with Hasegawa moulds, the parts click neatly together with only minimal filing and finishing required. Two sets of markings, for a British-based aircraft or a USAAF aircraft in Vietnam are supplied, together with colour scheme details. Kit costs 8s 6d. C.O.E.

JONES Bros, of Chiswick tell us that the Tamiya 1:35 scale German figures designed to go with the Tamiya tanks are now once more available, but at a higher price. The tank crew set costs 4s and the infantry set is now 4s 9d. The Otaki Puma armoured car kit to 1:35 scale is also once more available, but now priced at 25s 11d. Finally Jones Bros say that the supply of Heller kits in Britain has now ceased for the time being and that Heller kits recently reviewed in *Airfix Magazine* are no longer available.

## Hunter Trio—from page 24

be added after the other conversion work for the Mk I has been carried out. This nose can easily be fabricated from balsa or obechi. Missiles can be obtained from the scrap box or made from plastic rod and card.

## Record-breaker

Finally, to complete an interesting trio from the Hawker stable, the famous all-crimson WB188 which held the absolute World Speed Record, can be modelled using the same basic conversion work. Once more a new nose is needed as well as the addition of a new more streamlined canopy. The biggest job on this

particular aircraft is the removal of the under-fuselage speed brake and its replacement with two either side of the rear fuselage. But these points are clearly shown on the accompanying photograph and should present little difficulty to the more expert modeller.

Whichever version you choose to model, there is no doubt that it will be a welcome addition and if the DFSL one, complete with yellow or red paintwork and squadron markings is chosen, a few eyebrows may be raised by those who are not familiar with this unusual finish.

The writer would like to express his thanks to the Hawker Siddeley Aviation Company for their valuable assistance.

AIRFIX magazine



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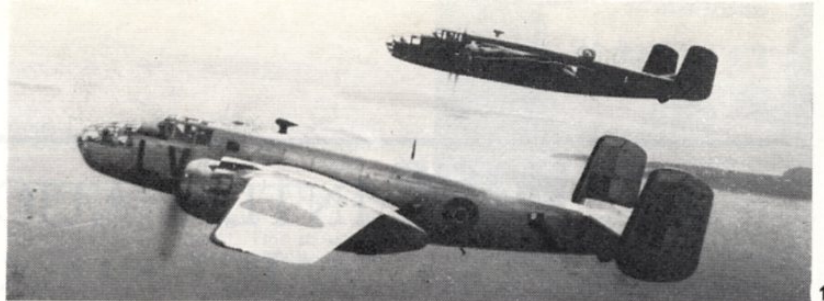
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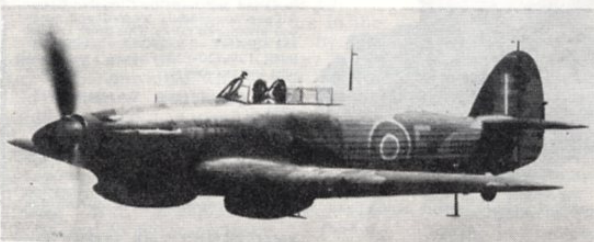
## photoPAGE

More rare pictures from readers with captions by Michael J. F. Bowyer. A free Airfix kit is awarded for every picture published, but please note that there is usually a delay of some months before publication due to the limited space at our disposal.



Key: (1) An interesting shot of Mitchell IIs of No 111 OTU, Nassau. Note mixed finishes—all silver or grey/green. LV is KL-154 coded in black. Camouflaged machine is coded MY, possibly red, in same position (Philip Bowles).

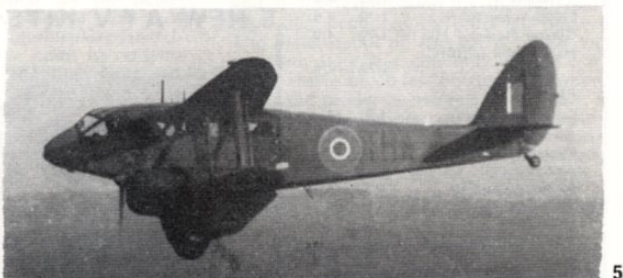
Key: (2), (3), (4) These pictures show for the first time 128 Sqn, RAF, in West Africa. Hurricane A is BH217, F is BH126. The owner of Buffalo AS416 may be 128 Sqn too. It's the first photograph to show a Buffalo in Type C roundels, incidentally. 128 carried no codes as it was the only Hurricane Sqn in Sierra Leone, where it was based at Hastings. Camouflage for Hurricanes was green-brown-sky apparently.



Key: (5) Dominie NR 750-THA from Station Flight, RAF Halton, pictured over Exmouth in October 1946 from an accompanying Anson. Finish is in green/dark earth/ yellow with red codes (W. M. Payne)



Key: (6) Harvard II KF331-4M-Q of 695 Sqn at Exeter in July 1946. It is yellow overall with black A/D panel and codes, and green wheel hubs. Original print shows fresher yellow patches where earlier codes had been painted out. (7) Anson XX VM323-9QX at RNAS St. Merryn in August 1946. It is silver overall with black codes and was based at Aston Down (M. W. Payne).



### News from Airfix—from page 8

THE Airfix scale model construction kit of the BAC Jaguar in 1:72 scale includes 78 finely-detailed parts and when made up the aircraft measures 9 inches long with a wingspan of just over 4 inches. A figure of the pilot in authentic RAF flying gear is included in the kit and modellers can position the four Sidewinder rockets under the wings. The kit costs 6s. Designed before the actual aircraft depicted was completed, the markings given in the kit differ slightly from those now carried.

LATEST Airfix car kit is a Toyota 2000 GT in 1:24 scale. It has 120 parts including 'chromed' trim, wheels, and other components. Beneath the removable bonnet is the six-cylinder in-line engine, with double overhead camshaft, which has been accurately reproduced. The UK price of this Japanese car from Airfix is 15s.

ANOTHER Airfix warship kit is for HMS *Leander*, one of the A/S frigates currently in RN service. Minute deck detail includes sophisticated communications and detection equipment, breakwaters, anchor chains, lifeboats and rafts, plus the turret carrying two 4.5 inch dual-purpose guns. The dipping asdic anti-submarine detector equipment, three-barrelled Limbo mortar and Seacat missile launchers are all accurately reproduced. Optional pennant numbers for other frigates are included on the transfer sheet and many conversions are possible from this kit. It costs 2s 11d.



# Letters to the Editor

## Anson recalled

ON the 'Photopage' feature in the February *Airfix Magazine* you published a photograph of Anson XII PH658 of 78 Sqn at Heliopolis, 1945. This was of great interest to me as I often worked on, and flew in this aircraft, when we both served with 66 Group Comm Flight, RAF Turnhouse, from my posting there in June 1951, until 658 crash-landed near Dishforth one night in early 1952.

Ian McConnell, Cheadle, Cheshire.

## Phantom colour

IN the April 1970 edition of *Airfix Magazine* you published a very good article entitled 'Phantom Quartet'. When describing the colour scheme for the Blue Angels machine, Mr Thompson said that the fin cap and tailplane tips were high gloss yellow. This is perfectly true but the wing tips are also yellow, and not natural metal as he seems to imply, but apart from this minor point the article was very good indeed.

S. Brown, London, SW2.

## Gnat markings

JUST for the record I can add some further details to your article on the Red Arrow Gnats.

(1) At the top and on the sides of each ejector seat (front and rear) there is a white square and a white stencilled number, eg, □ LR313 on Gnat XR996.

(2) On each u/c door (nosewheel) there are two blue stripes in the form of an inverted 'V', apex leading.

(3) Pilots and groundcrew names for each aircraft (at 16.4.70) are painted in white lettering on fuselage side as follows:

XR987 Fl Lt J. D. Rust  
Sgt C. Blight  
XR986 Sqd Ldr D. Hazell  
CT. G. M. Souther  
XR540 Flt Lt C. H. Dick  
SAC J. Bell  
XR996 Fl Lt R. B. Duckett  
CT M. Thomas  
XR991 Fl Lt Perreux  
Cpl M. Sivell  
XR545 Fl Lt Loverseed AFC  
Sgt J. H. Stuart  
XR993 Fl Lt Macintosh  
Fl Lt G. E. White  
(Engineering Officer)  
XS107 Fl Lt D. S. B. Marr  
Sgt S. D. Fowler  
XS111 Fl Lt J. S. Haddock  
Cpl D. S. Jones  
XR994 Fl Lt D. Smith  
Sgt R. Turrell

This totals 10 aircraft, comprising nine for the team and one spare machine.

R. Tedman, Dartford, Kent.

## Smoke black

READERS may be interested to know how I found a realistic way of obtaining certain car engine details.

Most car modellers just paint the bulkhead and inside walls of the engine area matt black. Instead I set a light to a plastic sprue, and coated the engine walls with the thick black vapour given off by the sprue.

September, 1970

Letters to the Editor selected for publication entitle the senders to each receive a free Airfix plastic construction kit of their choice. We are always pleased to receive your comments and pictures, which will be considered for publication. Submitted material and pictures can only be returned if accompanied by a stamped addressed envelope, and the Editor cannot accept responsibility for safe keeping of any such contributions, neither does he necessarily agree with comments expressed by correspondents in the letters column. Please note that any letters anticipating a reply MUST be accompanied by a SAE or stamp.

This gives a very realistic 'Natural Black'.

Care should be taken not to hold the part being treated too close to the sprue, as this could lead to distortion. This method can also be applied to small details, such as exhaust fumes at the end of exhaust pipes.

P. J. Galazka, London, SW16.

## Making flags

THANK you for an excellent magazine especially the 'Make a signal' feature by Peter Hodges in the March issue.

Instead of painting flags with water colours as suggested in the article, I used fine felt-tip water colour pens made by Platinum. These gave good results and a perfect straight line when a ruler was used. Some care however is needed to prevent spreading at the junction of different colours. I also used coloured ball point pens with fine tips for making small details, as in the Union Flag in the White Ensign.

I have also found I think an easy way to make black boot-topping on hulls of model ships. Sellotape make a black polythene insulating tape which is not too thick and is smooth. It is easily cut and easier to handle than ordinary Sellotape, and can be obtained in other colours. The finish produced is very good.

Again thank you for many interesting articles especially those on warships.

A. Follett, Aldershot, Hants.

## Micromodels

I NOTE with interest the recent correspondence in *Airfix Magazine* concerning early Micromodel kits. I have in the past made up many of the Micromodel range and others sharing this interest might like to know that some supplies are still available from Broadway Approvals Ltd, 50 Denmark Hill, London, SE5. The full range is, unfortunately, no longer available, but most ships, and some railway kits may be had, including my favourite, a set of three goods engines and five assorted wagons. One or two architectural and miscellaneous items are also available.

Brian Bigwood, London, SE12.

## Aircraft identified

I AM a keen reader of your magazine; I find that each issue contains a goldmine of useful information on many topics of vital interest to plastic modellers. This, a deeper interest for me than it may be for many others, because of a visual handicap

which has prevented me from taking part in most outdoor activities such as sports. I have a sizable collection of 1:72 aircraft, predominantly depicting those of the last war.

The Photopage of the March, 1970 issue of *Airfix Magazine* included photographs of Mosquito and Mustang aircraft of the Royal New Zealand Air Force. Here are a few points which will be of value to anyone making models of these aircraft. Let's take the Mossie first. NZ2331 carries the YC codes of No 75 Sqn, RNZAF, based at Ohakea. Note that the A/D panel comes forward to a point above the nose, and that rectangular panels were also painted on the inner sides of the engine nacelles—in much the same manner as the USAAF B-17s. Spinners are gloss black whilst propeller blades are matt, with yellow tips and stencilling. These were the Nash-Kelvinator paddle-bladed type, replacing the original DH units with which the aircraft were fitted when they arrived (camouflaged) from the UK in 1947. Canopy frame is silver, and serials are carried underwing thus—NZ 2331—the space marking the position of the teardrop wing-tanks, which were frequently carried, along with rocket rails. A squadron crest was carried above the fin flash.

Now to the Mustang. These aircraft were used 1951-57, mainly by the Territorial Squadrons—the 'Week-end Warriors'. NZ2403 is shown in the yellow/black checkers of No 2 (Wellington) Territorial Sqn normally based at Paraparaumu and Ohakea, but photographed while at Wigram (Christchurch) on a visit. This would have been in 1953, for the Squadrons were not formed until 1951, and the colourful checkers were not introduced until 1953. This aircraft is silver-doped overall, as was the Mosquito. Some later Mustangs had natural metal fuselages and flaps. Note that the aerial mast is gloss black, and 03 was repeated ventrally, just aft of the small intake at the nose. No underwing serials were carried, although the machine was fitted with zero-length rocket launchers. Interiors were in the zinc-chromate green, with black instrument panels, and dark green inside faces of u/c gear doors. Metallic black seat, with brown cushions. On both aircraft, Medium Blue was the shade used in the roundels and flashes. BS 381C, Light French Blue, is a good match for the 'in service' shade.

R. E. Montgomery, Blenheim, NZ.

## Dornier testbed

I WAS very interested to see the vintage conversion article on the Dornier Do 217E-2 in the June issue of *Airfix Magazine*.

As is stated in the article, 'a variety of unlikely aircraft were roped in by the Germans for use as flying testbeds for jet development'.

Besides the aircraft already mentioned, a Saenger supersonic jet was flight-tested at subsonic speeds, mounted on a Dornier Do 17Z testbed, during 1941. The machine was coded BC+NL and finished in standard Shawzgrun/Dunkelgrun on all upper

Continued on page 41



## Two outstanding new books for modellers



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Edited by Chris Ellis, Editor of Airfix Magazine

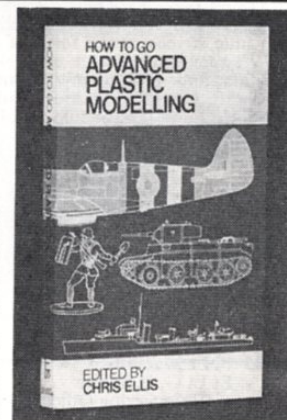
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## Letters—continued

surfaces with Hellblau undersurfaces. A photograph of this machine can be seen in Profile No 164, the Do-17 and 215, by J. R. Smith.

The BF-110 G-4/R3 illustrated in the 'Toasting Fork' conversion, incidentally, belonged to 2/NJG 5 based at Dreux airfield, France, in June 1944.

P. A. Ruff, Birmingham, 29.

## Jaguar changes

I RECENTLY purchased the new Jaguar kit. It is a very impressive model when completed but there are several necessary modifications to be made.

(1) The two underfuselage fins have been omitted and these must be added from Plasticard. The position and shape can be determined from photographs.

(2) Jaguar S-06, the subject of the kit, only has one light, the port one. The other should be filled in on the nosewheel door.

(3) The instructions do not make it clear that the underwing serials should be applied before cementing the store pylons on and that the larger fuselage door for the nosewheel is always closed except during lowering and retracting the undercarriage.

Despite these few mistakes the kit is a very good one and should be included in any collection but I am sure that many kit converters would have appreciated a choice of the two versions since it would have saved moulding the longer canopy of the two seater if they wanted that version.

S. Page, Chislehurst, Kent.

## Dust treatment

RECENTLY you have received a lot of correspondence regarding dust specks in painted models. I have a simple method which leaves a beautiful finish on plastic surfaces which by their very nature attract any particles in the atmosphere. Naturally fresh paint should be used always, but the secret is to dip a small piece of muslin or similar fluffless rag in a small amount of clear varnish, and gently brush across the surface of the model. This in effect lifts any particles just prior to painting—so simple yet it works perfectly, only enough varnish is used to make the rag tacky.

I wonder how many people, who received the Czech kit of the L-29 Delfin from your correspondent on an exchange basis, were baffled by the painting instructions for the Uganda version. The list of translation is as follows:

CERNA—BLACK  
CERVENA—RED  
SVETLE SEDA—PALE GREY  
SKORICOVE HNEDA—CINNAMON BROWN  
SVETLE MODROZELENA—PALE BLuish-GREEN

B. R. Clay, Tile Hill, Coventry.

## 'Leander' colours

RECENTLY I bought the Airfix model kit of HMS Leander, and I thought readers might be interested in the following:

The colour scheme given for the decks in the instructions is Brick Red and during nearly 12 years service in the Royal Navy, including some 18 months on a 'Leander' Class Frigate, I never saw as much as a single ship with Brick Red decks.

The forecastle from the bows to the breakwater was painted Red Admar. However the remainder of the decks were Brunswick Green with the exception of the Flight Deck, which on HMS Ajax at least, was Dark Grey. Red Admar is a 'choco-

late-red' shade, similar to the Bauxite Red of freight wagons on the railway.

I know for certain that in 1966 both the Leander herself and HMS Dido were as above. Also in 1968, I know for certain that Arethusa was the same.

Finally readers might like to note that the early 'Leanders' (HMS Leander, Ajax, Euryalus, Dido, etc) were fitted 'for but not with' Seacat Missiles. In lieu of these were 2 single barrelled, 40 mm Mk 9 Bofors, aft on the Seacat Deck.

Also it might be of interest to note that the Wasp helicopter had painted in white on the nose the name of the ship and the Flight Number.

R. C. Dowsett, Wixoe, Essex.

## Question of colour

RECENTLY, while doing the painting and finishing on my latest aircraft kit, I found myself thinking of some correspondence which took place in Airfix Magazine approximately a year ago. It concerned the use of different shades of paint, not necessarily of the correct colour, on warship models in order to enhance their appearance by bringing out the contrast between light and shaded areas and high-lighting small details.

However, as I said, I was thinking of the question of colouring in connection with aircraft, and in my opinion a good case can be put forward for the use of 'unofficial' shades of colour on these models. At the present moment there seems to be a sort of mania for the use of 'authentic-exactly-as-the-original-not-one-degree-of-difference, type paints. I have a sneaking suspicion that this idea has been secretly fostered by the paint manufacturers whose 'authentic' paints are inexplicably dearer than their normal range. I would disagree with the premise that the use of these types of paints increases the authenticity of a model.

Surely the aim of a modeller is to create a small replica of his prototype which looks like it and captures its essential character. If doing this means that he feels that he must make use of overscale parts or different colour shades, then I feel that he is perfectly justified. After all, what looks like one thing on a full-sized aircraft may look completely different on a scale model; the varying tones of gloss and matt finishes provide a good example of this phenomenon. It is my opinion that the new 'authentic' paints not only do not necessarily make a more realistic model; they can in fact detract from its possible realism!

For instance, in pictures of wartime aircraft the camouflage pattern is usually fairly distinct, especially in colour photo-

graphs, and, again in colour photographs, the actual colours are generally easily distinguished as green, grey, brown etc. In fact although dark colours they are light enough to be distinguished from each other rather easily. However on most models which I have seen, the authentic colours although doubtless the exact shade, appear to be far too dark and also somewhat indistinct. In fact dark green on some of these models looks more like dark grey! This just does not look right. It may be the perfect replica of the original shade but surely this is of little value if the finished aircraft has none of the character of its prototype. On the other hand, however, a model painted with ordinary paints, for instance ordinary Airfix M5 and Humbrol M30 which I habitually use on brown and green British aircraft (eg, the Blenheim), looks, I think much more like its original because in small scale the lighter colour of paint gives the same visual impression as the darker paint gives on the full sized machine.

I would like to make it clear however that I am definitely not an advocate of the use of completely way out, multi-coloured, 'flower power' finishes simply because of their weirdness; but I do think that far too much emphasis has been placed on the subject of exact colour shades in recent months, emphasis which I think is completely unnecessary and which has been given far more attention than its merits demand.

Gordon M. S. Millar, Bishopbriggs, Lanark.

Before others write, there are just 3 points I would like to make: (1) On full-size aircraft the contrast between the camouflage colours used was generally nothing like so vivid as on a model once the initial 'newness' went out of the paint. If you view the Spitfire in the Imperial War Museum—which remains with scratches and stains and generally untouched since 1944—from any distance you get an impression of overall 'neutral grey-ness' which after all was the object of the camouflage finish. The demarcation between the dark grey and dark green areas of the upper surfaces doesn't strike you anything so clearly as it does on a Spitfire model painted in exactly the same pattern and shades. (2) The 'authentic' colours are undoubtedly convenient (in my view), particularly the more complex shades like the various US Navy blues, for it is difficult to mix some of these colours from standard shades. (3) 'High-lighting' has long been an accepted technique in painting model soldiers (see Roy Dille's article this month) and in my experience it comes off very well on other models also so long as it is not overdone.—EDITOR.

## German Trucks—from page 27

do) and springs are now fitted in place but, before they dry, pop a wheel on each axle and with a little weight in the back check that it all sits square and all the wheels touch the ground. Adjustments can quickly be made before the front axle sets in place.

It is now only necessary to add the final details like the lights, bumper, opening portions on top of bonnet, body ironwork and racks along the sides, the hood from folded tissue and stretched sprue, and the crew if you require.

Paint all the wheels and tyres (an extra pair will be required but these can come

from anything of similar size if they are used as the inside wheels of the first rear axle) before you assemble and note that the rear wheels do not slide fully on to the axles. Set them up to the dimensions shown in the drawing.

Finish is again in Humbrol Afrika Korps sand with a brown mottle effect or a dark grey/green with plenty of 'mud' if you want it on the Russian Front. Both these models should go a long way to fulfilling your transport needs for the Germans in wargames or military collections. Even a beginner to kit converting should have no trouble with making the KM semi-track truck.



## New tank books

TANKS AND OTHER AFVs, by B. T. White. Published by Blandford Press Ltd, 167 High Holborn, London WC1. Price 25s.

YET another 'first', this time in a new series 'Mechanised Warfare in Colour', this book is uniform in style with the well-known Blandford 'Aircraft in Colour' series and it follows a similar format with 96 plates in colour plus descriptive text keyed to the illustrations. This first volume covers the years 1900-1918 and is very well produced and well written with two views of each vehicle covered, plus a number of cut-aways as well. As a good basic coverage of its subject it could hardly be bettered and at the modest asking price it makes an excellent buy for both the armour enthusiast and for any beginner to the subject. The vehicles covered range from the Fowler armoured traction engine of 1900 to the Medium Mk C tank of 1918.

## Armour and arms

MODERN BRITISH TANKS AND FIGHTING EQUIPMENT, by Peter Chamberlain and Chris Ellis. Price 20s.

MILITARY PISTOLS AND REVOLVERS, by I. V. Hogg. Price 21s.

Both published by Arms & Armour Press, 677 Finchley Road, London NW2.

FIRST of these two books deals almost entirely in pictures with the current inventory of vehicles and equipment of the British Army. It features tanks, armoured cars, principal trucks and light vehicles, artillery, missiles, radar, and so on. There are over 130 pictures and coverage includes recently announced vehicles not yet in service, plus vehicles made in Britain for overseas forces. Detailed data tables and specifications for all the types shown complete this handy little volume.

The second book covers the principal hand guns in the two world wars and is a most useful reference volume since it includes good, big pictures, specifications, and well written histories and descriptions of the pieces shown. The last section of the book illustrates the bullets and gives detailed ammunition data. Highly commended for weapons enthusiasts, this.

## Uniform books

GERMAN COMBAT UNIFORMS, 1939-1945, by S. R. Gordon-Douglas. Price 12s 6d.

BRITISH INFANTRY UNIFORMS, 1660-1914, by A. H. Bowling. Price 17s 6d (paperback) or 25s (hard covers).

Both published by Almark Publishing Co Ltd, 104-106 Watling Avenue, Edgware, Middx.

BOTH the latest Almarks books deal with uniforms, the first being in similar style to previous Almarks books. It has numerous line drawings and pictures inside. For its small size it offers a remarkably complete coverage of the main uniforms worn in action by the Army, Waffen-SS, and Luftwaffe paratroops and ground troops, certainly sufficient for the average modeller to absorb. Apart from many rare pictures there are complete drawings of rank badges and listings of ranks, a glossary of terms, rank equivalents, and lengthy descriptive text.

The second title in a new format is a companion to the earlier *Scottish Regiments* by the same author and covers the same period. There are 114 small uniform drawings in colour as in the *Scottish Book*, plus three old contemporary colour prints. There are multi-view drawings, useful for modellers, showing the dress from various aspects with each significant change of style, plus detail drawings of some individual garments. Appendices include drawings of small arms and head-dresses. The text is much longer than in *Scottish Regiments* and there are more illustrations overall, hence making for a bigger and more detailed book.

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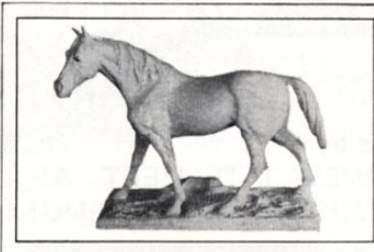
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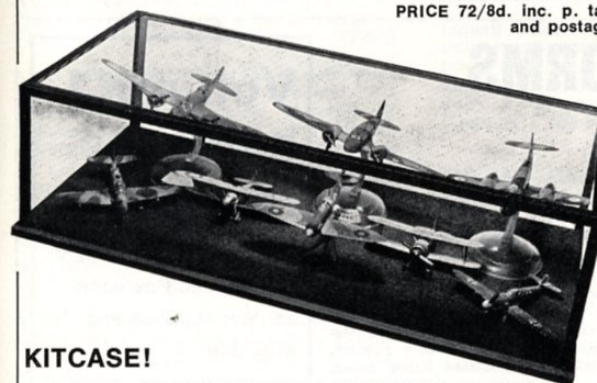
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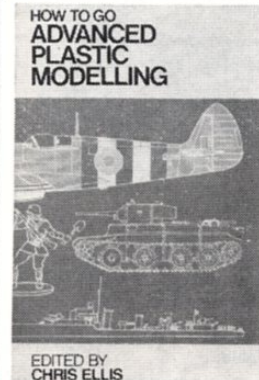


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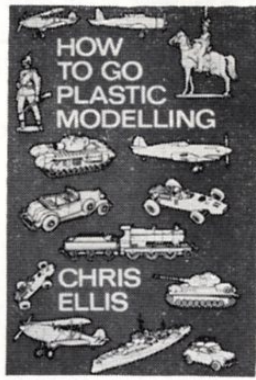
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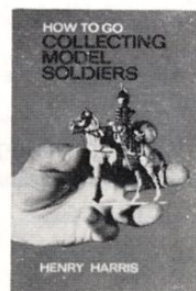


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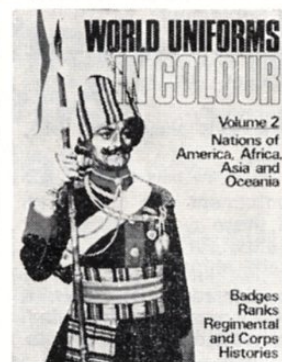
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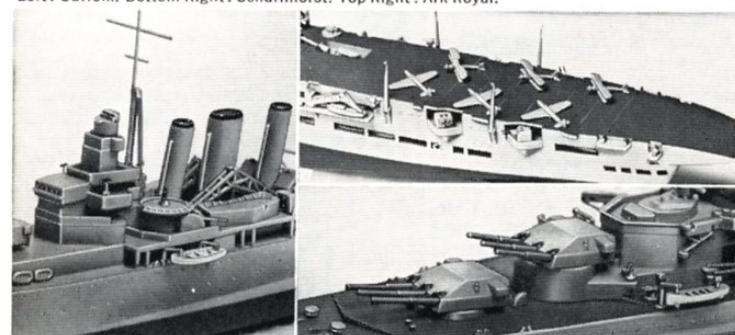


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